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LEPIDOPTERA INDICA.



LEPIDOPTERA INDICA.

BY

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VOL. I.

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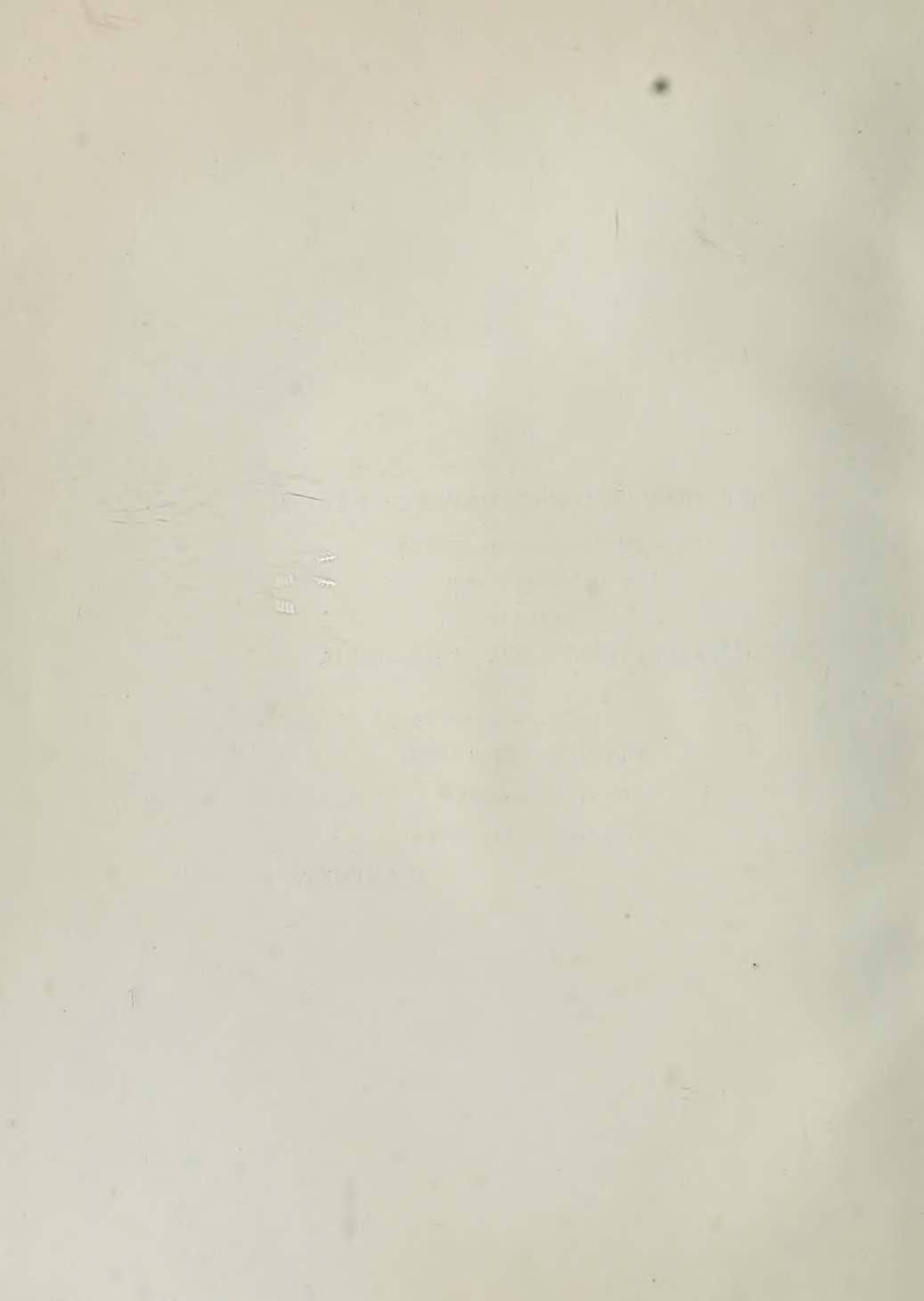
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Biology

TO
HER MOST GRACIOUS MAJESTY VICTORIA,
QUEEN OF GREAT BRITAIN AND IRELAND,
AND EMPRESS OF INDIA,
THIS WORK ON THE
LEPIDOPTEROUS FAUNA OF INDIA
IS
(BY ROYAL PERMISSION)
HUMBLY DEDICATED
BY HER MAJESTY'S
LOYAL AND OBEDIENT SERVANT
THE AUTHOR.

Entom. Records of Nat. = 10v. 18/6/57 H. C. H. H.



PREFACE.

THIS WORK, describing and illustrating the Lepidopterous fauna of India, has been in course of preparation for several years, and the time has now come when it is incumbent on me to put into a systematic form for publication and future use the materials at my disposal.

The geographical area embraced in the "*Lepidoptera Indica*" will be the limits of the Indian Region as defined by the Himalayan mountains on the North, the Suleiman and Hala mountains on the North-West, Ceylon on the South, and by Burma on the East, including the Andaman and Nicobar Islands.

Having, in 1848, become attached to the Staff of the Museum of the East India Company, then under the Directorship of Dr. Horsfield, and, as Assistant-Curator, held that office until the transfer of the collections to the National Museum in 1879, I had, during those years, unusually favourable opportunities for studying the Insect fauna of the Indian Empire. Since the period of 1859, and the then removal of the Natural History collections from the Museum, an unremitted study of the Lepidopterous Insects has been maintained, as well as the acquirement of materials for that purpose.

An extensive, and presumably, the most complete collection, illustrative of this portion of the Insect fauna of India, has been brought together, at considerable personal outlay, and by the contributions—specially intended for this work—from numerous friends and correspondents who held or are now holding positions in the Civil and Military service in various parts of India. To all these my present grateful acknowledgments are due for their generous aid. The most important of these contributions—the enumeration of which will show their character and great value, are here referred to in their chronological sequence, as follows :—

First come those of my late friend Arthur Grote, whose earlier contributions were published in the East India Company's "*Catalogue of Insects*" in 1857-59, and who, whilst resident for many years at Allipur, near Calcutta, devoted very considerable attention to the metamorphoses of both the butterflies and moths of that district, coloured drawings of these being made by the highly-skilled native artist, Munshi Zynulabdin, whom he employed for that purpose. On his retirement to

England in 1868, not only his collection was placed in my hands for selection of specimens, but also the whole of the valuable and unique series of drawings of larvæ, &c., was placed at my disposal for utilization in the present work. Many of these butterflies and moths have been described by me in the "Proceedings of the Zoological Society of London" for the years 1865, '67, '74, '78, '79, '83.

Sir Walter Elliot—specimens and notes, and especially numerous drawings of larvæ, pupæ, &c., made mostly at Madras from 1849 to 1857.

S. Nevill Ward—specimens collected on the Malabar Coast prior to 1863, and in 1870 numerous drawings of larvæ, pupæ, &c., and copious field-notes.

W. S. Atkinson—specimens at various times from 1859 till his return to England in 1875, many of which have been described in *Proc. Zool. Soc. Lond.*, for 1865, '67, and 1874. From the extensive collection made by him, chiefly in the district of Calcutta, and during repeated visits to Darjiling, placed in my care previous to its disposal in 1875, I was fortunately permitted to compile a complete list of the contents—noting also the localities in which the named species were captured. Subsequently, the whole of the undescribed species of moths have been examined and recorded by me in the "Memorial" work, published by the Asiatic Society of Bengal in 1879 to 1888, and also in the *Proc. Zool. Society* for 1878, '79, and '81.

A. E. Russell—numerous specimens from various parts of lower Bengal, and Darjiling; an enumeration of this collection being recorded in *Proc. Zool. Society* for 1865-67.

Colonel A. M. Lang—numerous specimens, chiefly of butterflies, and field-notes, made mostly in Oudh, Kashmir, Simla, and neighbouring N.W. districts from 1864-68, some of which have been recorded in *Proc. Zool. Society* from 1865 to 1883.

Capt. T. Hutton—butterflies and moths from Masuri and neighbourhood, from 1861 to 1871.

Major J. Lind Sherwill—numerous specimens in 1863, collected in the North-Eastern districts of India.

Capt. H. L. de la Chaumette—notes and descriptions of the metamorphoses of various butterflies and moths observed and reared by him in the district of Lucknow previous to 1863.

C. Horne—many specimens in 1869 from Manpuri district; some of which are recorded in *Proc. Zool. Society*, 1872, '78, and '81.

Dr. F. Day—specimens from Madras in 1866, Dekkun in 1859, Nilgiris in 1868, and Simla in 1872.

W. Forsyth Hunter—various drawings of Bombay insects in 1871.

Major J. Le Mesurier—specimens from Sind in 1873.

Major-Gen. G. Ramsay—numerous butterflies and moths collected during his residency in Nepal. Several of these are recorded in *Proc. Zool. Soc.*, 1874, '77, '78, '79, and 1883.

Lt.-Col. H. H. G. Godwin-Austin—specimens from Dera Dhun and the Khasia Hills; several of these are recorded in *P. Z. S.* 1872 to 1883.

Capt. R. Bayne Reed—specimens from Malabar, Solun, and Kashmir in 1873, '79; many recorded in *P. Z. S.* 1874 and 1881.

W. B. Farr—numerous specimens in 1875 to 1878 from various parts of India.

G. H. Wilkinson—butterflies from Bombay and Kutch, collected in 1871, '72, and '73.

Dr. A. Leith—numerous specimens from Bombay District in 1875.

Dr. J. Shortt—various butterflies and moths from the Shivaroy Hills in 1864 and 1878.

Capt. H. B. Hellard, R.A.—Cashmere butterflies. Many of which are recorded in *Proc. Zool. Society* for 1874-78.

W. C. Hewitson—many species at various times, and rare specimens from the "Atkinson" collection.

Prof. J. O. Westwood—for copies of numerous drawings of larvæ, pupæ, &c., made by R. Hunter at Saugor in 1851-2.

Dr. J. Anderson, the Superintendent of the Indian Museum, Calcutta—for specimens of Andaman and Mergui butterflies and moths, recorded in *P. Z. S.* for 1877, and *Journ. Linn. Soc. Zool.* for 1886.

Prof. J. Wood-Mason, Deputy-superintendent Indian Museum, Calcutta—for placing in my hands for description the collection made by Mr. Limborg in Tenasserim, and recorded in *Proc. Zool. Society* for 1878.

Rev. J. H. Hocking—for butterflies and moths from the Kangra district; recorded in *Proc. Zool. Society* for 1832 and 1888.

Mrs. F. A. de Roëpstorff—for specimens in 1884, collected in the Andaman and Nicobar Islands.

A. Lindsay—specimens from the Nilgiris in 1882.

G. A. J. Rothney—for specimens collected at Barrackpur, near Calcutta, in 1882, '83, '84.

Colonel C. Swinhoe—for very numerous specimens from Bombay, Mhow, Karachi, &c., including many typical examples; and for the opportunity of recently examining the whole of his collection.

Major J. W. Yerbury—various specimens from Campbellpur and other districts of the extreme North-West of India.

L. de Nicéville—specimens, received at various times, of typical species described by him in *Journ. As. Soc., Bengal*.

H. J. Elwes—various Sikkim butterflies, in exchange for typically-named species.

Honble. L. W. de Rothschild—for opportunity of studying a large collection made at Buxa, in Bhotan, 1888.

G. F. Hampson—for numerous Nilgiri specimens.

Very numerous visits have of necessity been made to the Entomological Department of the British Museum, where every aid has been afforded me in studying the contents of the National Collection, Mr. A. G. Butler's knowledge of which being of the greatest service, and Mr. W. F. Kirby's help frequently sought upon difficult questions of nomenclature and bibliography.

Of the various collections belonging to private individuals in this country, those of Mr. W. L. Distant, Messrs. Godman and Salvin, Mr. H. Druce, Mr. H. Grose-Smith, Mr. H. J. Elwes, and more recently those of Mr. J. J. Weir, Mr. J. H. Leech, and Mr. P. Crowley, have been freely at my service for study.

To my son, Mr. F. C. Moore, has been assigned the task of drawing and lithographing the numerous plates—an arrangement insuring the advantage of constant supervision of that portion of the work.

In conclusion, and with the view of making the "*Lepidoptera Indica*" as complete as is at present possible, I venture to ask the help of all interested in the study of this branch of the Indian fauna, who may have collections from any part of India or Burma—from many districts of which but few species are at present known. For this purpose, contributions or loans, either of specimens of butterflies, moths, and especially drawings of their caterpillars, &c., forwarded to the author and addressed to the care of the publishers, Messrs. Reeve & Co., 5, Henrietta Street, Covent Garden, London, will be most gratefully received and duly acknowledged.

FREDERIC MOORE.

LONDON, *January 10th*, 1890.

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LEPIDOPTERA INDICA.

THE insects comprised in this Order are divided into two groups or sub-orders; namely:—RHOPALOCERA or Butterflies, and HETEROCERA or Moths; the distinction between the two sub-orders being primarily based on the structure of the antennæ, which in Butterflies are more or less uniform in structure and clubbed at the tip, while those of the Moths exhibit great variations in structure and even in those of the sexes of the same species; the Butterflies form the highest members of the Order.

Sub-order RHOPALOCERA.

Butterflies are diurnal in their habits, with few exceptions, flying only in the daytime, and as a rule are active on the wing only during sunshine. They have sexually uniform antennæ, terminating in a more or less distinct club, with scarcely an exception have no ocelli, nor the curved bristle (or frenulum) serving in moths to connect the front and hindwings near the base, and usually undergo their transformations in the open air without spinning any encircling cocoon. They are divisible into five families, namely:—I. NYMPHALIDÆ; II. LEMONIIDÆ; III. LYCENIDÆ; IV. PAPILIONIDÆ; V. HESPERIIDÆ, of which the following are their general structural characters, extracted mostly from Mr. Scudder's "Butt. of the E. United States," pp. 105-8.

FAMILY I.—NYMPHALIDÆ.

IMAGO.—The *front pair* of legs atrophied, and unfitted for walking. *Antennæ* with a straight or drooping club. *Wings* with the outer margins usually crenulate, dentate, sinuate, or angulate; frontwings with the subcostal vein five-branched; hindwings with three median branches, inner margin always embracing the abdomen.

EGG.—Either reticulate and then subglobular, or else vertically ribbed and generally trellised over at least the upper half, and then never more than one-half as high again as broad.

CATERPILLAR AT BIRTH.—Head generally larger, never smaller, than the thoracic segments, and generally scabrous; when of the same size, the corneous crown of the head is never encroached upon by the integument of the first thoracic segment, and the body is covered either with series of very long hairs (in which case most of them are acicular and not clubbed at the tip) or with extremely short and distant acicular hairs.

ADULT CATERPILLAR.—Generally cylindrical, the head usually held in a vertical position, larger than the segments behind it, free and posteriorly contracted. Body furnished with continuous rows of spines or smooth lenticles, or with discontinuous rows of fleshy tubercles, or with short pile; in the last case either the head is tuberculate, or the last abdominal segment is furcate, or both, or the segments have but four transverse and nearly equal divisions.

CHRYSLIS.—Generally angulate, often strongly angulate, or if rounded, with shouldered prominences. It always hangs in a reversed position by its tail alone, except in the rare case of a few Satyridæ, which are rounded, without special prominences, have no cremastral hooks, and undergo their changes in a crevice upon, or a cell in, the ground; the head as high as or higher than the hinder end. (Scudder.)

FAMILY II.—LEMONIIDÆ.

IMAGO.—Of small or medium size. *Front legs* of male atrophied, those of the female perfect; front tarsi of male consisting of a single unarmed joint. *Antennæ* short, with gradually thickening club. *Palpi* very small and short, or long and moderately stout. *Wings* variable in form, cell closed by a very slender vein. *Hindwings* variable, in some rounded, angulated, or with one or more tails. *Anal segment of male* produced (Libytheniæ) into a median beak-like hook, upper organ slender, acicular processes directed downwards, clasps simple, forming broad plates; or (Lemoniinae) upper organ forming a hood-like plate, bearing slender arms, clasps variable in form, not differing much from those of Lycæninæ, but accompanied by a long basal finger.

EGG.—Elliptic (Libythea), the extreme apex truncate, sides with elevated ribs, traversed, like the surface, by horizontal raised lines; echinoid or tiarate (Lemoniinae) domed, the summit with a central depression, the surface delicately reticulated.

ADULT CATERPILLAR.—Cylindrical, unarmed (Libythea), slightly pubescent; sub-cylindrical or sub-onisciform (Lemoniinae), short, frequently covered with dense pile and sometimes ranged hairs or fascicles of hairs; or with lateral fleshy appendages.

CHRYSLIS.—Short, either slightly or not angulated; suspended by the tail; or in addition, attached by a median girth.

FAMILY III.—LYCÆNIDÆ.

IMAGO.—Of small size and delicate structure. The *front legs* sexually heteromorphous, the tarsi of the male being more or less atrophied, used for walking. *Antennæ* including the club, straight. *Forewings* with subcostal vein either three, four, or five branched, the discoidal cell closed by a weak vein. *Hindwings* with the median vein three branched, the inner margin never plaited. *Anal segment of male*

with the dorsal margin entire, upper organ of male genitalia with long, slender, strongly curved, lateral appendages.

EGG.—Tiarate or hemispherical, and more or less deeply reticulate.

CATERPILLAR AT BIRTH, so far as known, furnished with numerous long, tapering hairs, and with naked chitinous annuli, both arranged in longitudinal series.

ADULT CATERPILLAR, so far as known, either onisciform, subonisciform, or cylindrical; the body furnished with scattered coarse and scant pile, among which are some serially disposed bristles or fasciated hairs; or in some forms with stout fleshy processes longitudinally disposed.

CHRYsalis.—Usually short and stout, always bluntly rounded in front, the body rarely furnished with projections, and these invariably rounded. Median girth always close to the body at all points, the ventral surface of the body lying in a nearly uniform plane. Cremaster not at all or but slightly protuberant, the hooks inferior or apical. (Scudder.)

FAMILY IV.—PAPILIONIDÆ.

IMAGO.—Of medium or large size. *Forelegs* of both sexes as perfect as the other pairs, sometimes with an epiphysis or leaf-like appendage on inner side of the tibiæ. *Antennæ* with a gradually elongated, or stout, club. *Forewings* with the discoidal cell closed by a strong vein. *Hindwings* with the median vein three or four branched; the inner margin sometimes plaited. *Anal segment of male* with the dorsal margin notched or produced to a hook, upper organ of male genitalia with no lateral processes.

EGG.—Subglobular and smooth, or very much elevated and vertically ribbed and trellised (exception in *Parnassius*, in which it is tiarate).

CATERPILLAR AT BIRTH.—So far as known, furnished with longitudinal series of clubbed or forked hairs, or with prickly tubercles.

ADULT CATERPILLAR.—Cylindrical or enlarged anteriorly, covered with very short pile (in some forms with long hairs), mostly arranged in transverse rows, or with rather infrequent and irregularly distributed microscopic hairs, and often also with series of fleshy tubercles or filaments, or glabrous scarcely elevated lenticles.

CHRYsalis.—Elongate, unimucronate or bimucronate in front, generally with numerous angular projections, median girth often free from the body for a considerable part of its course by the ventral extension of the wing-sheaths, the ventral surface of the body being generally bent more or less strongly near the middle. Cremaster strongly protuberant and free, the hooks apical. (Scudder.)

FAMILY V.—HESPERIIDÆ.

IMAGO.—Of small or medium size, usually robust, with rather small wings. *Forelegs* perfect; the *front tibiæ* almost invariably have a foliate epiphysis on the

inner side, and the hind tibiæ a middle pair of spurs in addition to the terminal pair. *Antennæ* widely separated at the base, with a thick club, the tip more or less distinctly pointed and recurved. *Forewings* with the subcostal vein either four or five branched. *Hindwings* with the inner edge plaited; the fore and hindwings in repose often resting in different planes.

EGG.—Never noticeably higher than broad, and either hemispherical and smooth, or domed, vertically ribbed and trellised.

CATERPILLAR AT BIRTH.—Head always broader and higher than the body, the latter with ranged fungiform hairs, never, excepting on the seventh and eighth abdominal segments, so long as the segments; first thoracic segment with a distinct corneous dorsal shield.

ADULT CATERPILLAR.—Cylindrical, but slightly flattened beneath and stoutest in the middle, never spinous, generally minutely and coarsely pilose; with a large head, slender neck, and a transverse corneous shield on the upper surface of the first thoracic segment. With rare exceptions (among tropical forms) living in concealment.

CHRYsalis.—Smooth and uniform, rarely with a mucronate head, always enclosed in some sort of a cocoon composed generally of connected leaves lined very delicately with silk. (Scudder.)

Family I.—NYMPHALIDÆ.

Nymphales, Linnæus, Syst. Nat. (1758).

Nymphæ, Borkhausen, Eur. Schmett. (1788).

Nymphalidæ, Swainson, Phil. Mag. 1827, p. 187; Stephens, Brit. Ent. Haust. i. p. 27 (1827); Doubleday & Westwood, D. Lep. p. 144 (1852); Bates, Trans. Linn. Soc. 1861, p. 515, Journ. Ent. 1861, p. 220, *id.* 1864, p. 176; Kirby, Catal. D. Lep. p. 1 (1871); Moore, Lep. of Ceylon, i. p. 1 (1880); Distant, Rhop. Malay. p. 2 (1882); Marshall and De Nicéville, Butt. India, &c. p. 21 (1882); Trimen, S. Afr. Butt. i. p. 50 (1887); Scudder, Butt. E. Unit. States, i. p. 109 (1888).

Nymphalidi, Boisduval, Ind. Méth. p. 14 (1829).

Nymphaliens, Blanchard, Hist. Nat. Ins. (1840).

Tetrapodes, Dalman. *Tetrapæ*, Guéneé. Tetrapoda, Bar.

Heteropodes, Hoffmann. *Chilopodiform* or *Scolopendriform* Stirps, Horsfield.

Suspensi, Boisduval Spéc. Gen. Lep. i. p. 164 (1836).

IMAGO.—“Ordinarily of medium or large size. *Head* rather large, apart from the eyes, compact, of nearly equal dimensions. *Tongue* inserted opposite, or a little below the middle of the lower half of the eyes. *Eyes* prominent. *Antennæ* inserted near together, furnished with a straight or drooping club. *Thorax* rather large. *Forelegs* atrophied, especially in the male; but, in both sexes the claws and other terminal appendages of the last tarsal joints, and both spines and spurs of

the tibiæ are obsolete; the spines and sometimes the spurs of the tarsi are also absent; in some males the tarsi are not even divided into joints and they are always unarmed. *Anal segment of the male* entire above, the upper organ generally stout, with or without lateral arms, and provided with an elongate, tapering, pointed median hook, or if bifurcate only minutely excised at tip; clasps forming lateral, lamellate, more or less convex plates very variable in shape, proportion, and armature. *Forewings* with the costal vein terminating near the middle of the costal border; subcostal vein five branched, at least one of which is emitted before the end of the cell; the discoidal cell may be either closed or partially open; median vein three branched; internal vein, when present, very short and running into the submedian vein. *Hindwings* with the costal vein terminating between the middle and the tip of the costal border, emitting from near the base an upward-directed bifid branch (=precostal); subcostal vein three branched; discoidal cell either open or closed; median vein three branched; submedian vein usually terminating at the anal angle, sometimes on the outer border; internal vein usually terminating on the inner border, sometimes at the anal angle. Inner margin expanded, embracing the abdomen beneath.

Egg.—Globular or dome shaped, the surface marked either with polygonal cells (whose walls may be either slight or prominent), or else furnished with a number of raised longitudinal ribs, usually extending over the whole egg, but sometimes confined to the upper half and with much more delicate cross ridges.

CATERPILLAR AT BIRTH.—Head generally larger, never smaller, than the thoracic segments, and usually roughened, always with a greater or smaller number of hair-emitting papillæ; never encroached upon by the integument of the first thoracic segment. Body cylindrical, often tapering from the front backward, but rarely if ever from the middle forward, furnished with longitudinally ranged cuticular appendages of various shapes, generally longer than the segments and often more or less clubbed, some of the series shifted in position in passing from the thoracic to the abdominal segments; first thoracic segment with no distinct corneous dorsal shield.

ADULT CATERPILLAR.—Head free, furnished to a greater or less extent with hairs and sometimes with spinous processes. Body nearly or quite cylindrical, long and slender, equal or tapering toward either or both ends; or, single segments may be swollen wholly or in part, and then the caterpillar becomes distinctly moniliform; simply furnished with short hairs or bristles arising from minute papillæ, or else supplied with unequally or regularly distributed spines or fleshy tubercles; spiracle of the eighth abdominal segment on a line with the others.

CHRYSLIS.—Either suspended by the posterior extremity only, head downward,

or, in rare instances, with no fastenings whatever, and then transforming in an imperfect cell upon or beneath the ground, with little or no silken lining. The chrysalis is comparatively long and slender, enlarged in the middle and tapering, generally to a considerable extent, at either end; head advanced in front of the prothorax; ocellar prominences double, nearly always present at the side of the head; abdomen, with rare exceptions, destitute of a lateral ridge; cremaster stout, protuberant, the hooklets at tip moderately long and rather slender (in rare cases aborted), their apical portion thickened equally, or sometimes compressed, bent over like a crook, the apex conical." (Scudder, *l. c.* p. 109.)

GENERAL CHARACTERISTICS OF THE FAMILY NYMPHALIDÆ.—In this family are included the whole of the great division of butterflies in which the *forelegs* of the perfect insect are atrophied, having the tarsus rudimentary in both sexes. De Nicéville (Butt. Ind. i. 21) remarks :—"In the aspect of the perfect insect, the Nymphalidæ vary greatly; in shape from the long wing of *Hestia* to the short deep wing of *Kallima*; in colour from the sombre *Satyrinæ* to the brilliant *Euplora* and *Apatura*; in size from the tiny *Ypthima* to the gigantic *Thaumantis*; in structure from the weak *Erebia* and the delicately formed *Cyrestis* to the strong and rapid-flying *Charaxes*. In habit too there is an equally wide divergence, from the shade-loving, sometimes crepuscular *Melanitis* to the *Vanessa*, which basks in the hottest sunshine."

It corresponds with the "brush-footed butterflies" of Scudder (Butt. of the E. United States, i. 1888, p. 111), and from whose exhaustive work we gladly extract the following :—"This most extensive, as well as the highest family of butterflies, is spread over every portion of the globe; although its maximum of development is reached in the tropics, its relative numerical superiority is most evident in temperate regions, and especially the north temperate zone of the Old World, where its numbers nearly equal all other butterflies combined. Although this family has long been placed in a subordinate position, it is now generally considered by most philosophical entomologists to hold the highest rank among butterflies,—a position which was long ago given it by some of the early students.

The atrophy of the forelegs of both sexes, found only in this family and possessed by every member of it, and the suspension of the chrysalis by the tail only, are sufficient by themselves to prove that in this group must be assigned the highest rank. For, in the passage of the individual from the larval stage to the perfect form, the segment bearing the front legs has in all Lepidoptera become constantly reduced in size; and the atrophy of the legs borne by this segment, found in some groups and not in others, must be considered an evidence that a difference characteristic of change from a lower to a higher grade of life is also a characteristic of the passage from a lower to a higher grade of structure. Moreover, the chrysalids

which hang by their tails only, show, in the straight ventral surface of the abdomen of the vast majority of them, that they are descended from butterflies which in their chrysalis stage were also girt about the middle.

Although other families contain butterflies which vie with the Nymphalidæ in lustrous beauty, this largest family contains upon the whole by far the greatest number and variety of striking forms, whether we consider the butterfly, the egg, the caterpillar, or the chrysalis. There is also here a greater variety of structure than is found in any of the other families of butterflies. The colouring of the wings is also more varied than in other families, and more than in any other will one discover a striking difference between the colouring of the upper and under surface of the wings.

As one departs further and further from the lower Lepidoptera in ascending the families of butterflies, we discover a larger proportion of those which, when at rest, raise the wings above the back and expose only the under surface, instead of expanding the wings horizontally and so showing the upper surface, as in Moths. It is therefore upon the under surface of the wings of butterflies that we should look for a greater variety of colouring than upon the upper surface, at least in the higher forms; and this is exactly what we find.

Here, too, occur the greatest number of cases of protective resemblance and of mimicry.

Nor is the interest especially attaching to this family confined to structure and colouring alone. In habits and in life-histories the diversity of the type is everywhere displayed. For there is scarcely any variation in the regular cycle of changes which every lepidopterous insect undergoes which is not found within the limits of this family, and many are confined entirely to it. They pass the winter in every possible change excepting, so far as is known, in that of the egg, but including in one or other group every stage of larval life. The caterpillars are more often social than in other groups. There frequently enters also an element of lethargy even in midsummer. The behaviour of caterpillars for their protection against their enemies is exceedingly varied and interesting, and the forms of shelter constructed for their concealment are equally varied. The mode of pupation, is, as already stated, different from that of any other group, in that they hang by their tail alone, and in general quite freely, though there are a few instances, as *Cirrochroa*, in which the pad of silk is so tightly woven to the surface upon which it is spun, and the cremastral hooks of the chrysalis are spread over so long a surface that the chrysalis, instead of hanging freely, lies with its ventral surface in close proximity to the surface of rest. The method in which they accomplish their transformations, from the caterpillar clasping the pad of silk with its anal prolegs to the chrysalis whose hinder end, armed with little anchor-like hooks, is withdrawn from the shrivelled skin of the

caterpillar and plunged into the same pad, from which it shakes off the now useless larval cuticle, is exceedingly interesting."

Subfamily I.—EUPLEINÆ.

Danai festivi, Linnæus, Syst. Nat. (1758).

Festivi, Fabricius, Ent. Syst. iii. p. 39 (1763); Weber, Nomen. Ent. p. 99 (1795). Turton, Syst. Entom. ii. p. 54 (1806).

Tribuni, Herbst, Nat. Syst. Ins. (1793). Scudder, Syst. Rev. Amer. Butt. 1872, p. 28.

Limnades, Hübner, Verz. bek. Schmett. p. 14 (1816).

Danaidiens, Lamarck, Hist. Nat. Anim. iv. p. 26 (1817).

Heliconiide (part) Swainson. *Heliconiide* (part) Westwood; Doubleday.

Danaides, Boisduval. *Danaites*, Blanchard.

Danaide, Doubleday, Gen. D. Lep. p. 84 (1847); Felder, Wien. Ent. Mon. vi. 74 (1862).

Danainæ, Bates Trans. Linn. Soc. xxiii. p. 516 (1862); Kirby, Syn. Catal. D. Lep. p. 1 (1871);

Distant, Rhopalocera Malayana, p. 3 (1882); Marshall and De Nicéville, Butt. of Ind., &c., i. p. 21 (1882); Trimen, S. Afr. Butt. i. p. 50 (1887).

Danaina et *Heliconina* (part), Herrich Schæffer, Prod. Syst. Lep. p. 10 (1864).

Danaiden et *Neotropiden*, Schaatz (1885).

Eupleinæ, Moore, Lepidoptera of Ceylon, i. p. 1. (1881); Proc. Zool. Soc. Lond. 1888, p. 213; Scudder, Butt. E. United States, i. 703 (1889).

THE SUBFAMILY APPELLATION.—Linnæus, in his "Systema Naturæ," 10th Ed. pp. 467, 470 (1758), used the name *DANAUS* for both of the sections of his "Papilio Danai," namely the *D. candidi* and *D. festivi*, the species enumerated under the first section being modern "Pierinæ" and those of the second section mostly "Eupleinæ." In 1777, Esper (Die Schmett. i. p. 53) used *Danaus* in a generic sense for species of Pierinæ, representing the Linnean *D. candidi*, and in 1784 Esper (Natur. des Linneischen Systems, p. 214) again cites *Danaus* for species of Pierinæ. In 1788, Borkhausen (Natur. Eur. Schmett.) establishes his 4th 'Horde,' the "Danai," on modern Pierinæ. In 1793 Fabricius (Ent. Syst. iii. p. 39) separated the modern Danainæ under the name of *Festivi*, and restricted the term *Danai* to the *D. candidi* of Linnæus. In 1795 Weber (Nomen. Ent. pp. 99, 106) followed the restriction of Fabricius. In 1798 Cuvier (Tableau Élément. d'Hist. Nat. p. 590) cites species of Pierinæ only under *Danai*. In 1798 also, Cederheim (Faunæ Ingricæ Prod. p. 206) uses *Danaus* for Pierinæ only. In 1801, Panzer (Faun. Ins. Germ. Hefte, 73—84, p. xi.) also adopts *Danaus* generically for species of Pierinæ. In 1802 Walckenaër (Fauna Parisienne, ii. p. 266) gives only Pierinæ under *Danai*. In 1806 Turton (Gen. Syst. Entom. 11, p. 64) also restricts the *Danai* to species of Pierinæ.

Up to this period we see that the *Danai* of Linnæus has been restricted by the various authors cited to the species of modern Pierinæ. In 1805 Latreille used the name *Danaida* (Sonn. Buff. xiv. 108) which he altered to *Danais* in 1807 (Ill. Mag. vi.

291), and afterwards to *Danaus* (Gen. C. et Ins. iv. 201) taking for his type species the *D. plexippus*.

From the above historical enumeration of the restriction of the *Danai* to the *D. candidi* or modern Pierinæ, it is evident that the action of these earlier authors, in accordance with the inexorable law of priority, must take precedence of that of Latreille, who adopted species of the *D. festivi* as representing his genus *Danaus*. It therefore follows that its use, as subsequently applied by Latreille, cannot be retained in this group of butterflies, neither in its generic nor family form.

CHARACTERS OF THE EUPLEINÆ.

IMAGO.—“ Butterflies of large or moderate size. Head large, front swollen a little, protuberant beneath. Antennæ inserted on the summit, not in a pit, nearly as long as the abdomen, the club pretty long, and not very broad. Palpi stout, tufted with hairs, mostly ranged in a vertical plane. Thorax stout, rather compressed. Forewings elongated, produced at the upper outer angle and generally more or less excised along the middle of the outer border, the tip rounded and the outer border never angulated, except, occasionally, in a very slight degree; costal vein terminating a little beyond the middle of the front border, subcostal veinlets varying in their origin, usually at least one of which is emitted before the end of the cell; the cell at least half, and usually more than half the length of the wing, closed completely;” sometimes an incipient or lengthened spur, or recurrent veinlet, is emitted within the cell from either the upper or lower discocellular veinlet; “first branch of the median vein sometimes arising at the middle but usually at some distance beyond the middle of the cell, last branch curving at its base pretty strongly, often abruptly, toward the subcostal veinlets; internal veinlet, when present, very slender, and running into the submedian vein close to the base, causing the latter to appear as if double at its origin. Hindwings rounded, much smaller than the forewings, the disparity in length being greater than in any other subfamily; margins regular, tailless, the inner margin is sometimes guttered; costal vein terminating generally near the middle of the costal border, but sometimes reaching the outer angle; cell closed by a strong vein; median veinlets nearly equidistant, the first one generally arising beyond the middle of the cell; submedian vein usually terminating at the outer border, sometimes at the anal angle; internal vein usually terminating at the anal angle. MALES mostly possessing one or more pouches concealing scent-producing scales [‘androconia’], or a surface patch or patches of such scales on the hindwing; and sometimes a surface patch or patches on the forewing. Forelegs greatly atrophied in the male, less so in the female; in the male the tarsi consist of a nearly undivided joint, unarmed, in the female the tarsus ends abruptly, but consists of several, though not the normal number of joints, each furnished at the tip beneath

with a pair of short spurs; claws wanting; on the other legs the claws are very large and long, not falciform, and both with or without paronychiae and pulvilli. *Abdomen* long, rather slender. *Anal segment of the male* prolonged at the sides so as to resemble clasps, and to protect an extensible pencil or pencils of long hairs, each pencil being enclosed in a sheath; upper organ of appendages without lateral arms, small, the hook about as long as the centrum; clasps variable.

“EGG.—Stout, truncate-fusiform, bluntly pointed at the tip, with a great many longitudinal ribs and numerous distinct, transverse, raised lines. Laid singly, or sometimes (in *Mechanitis teste* Müller) in small clusters.

“CATERPILLAR AT BIRTH.—Head not larger than the thoracic segments and smooth. Body cylindrical, not tapering, furnished with short tapering hairs, usually not so long as the segments, arising from minute papillae, arranged on either side of the body in four longitudinal rows above the spiracles, besides, on the abdominal segments, two rows below the spiracles.

“ADULT CATERPILLAR.—Head small, well rounded, nowhere protuberant, smooth, broadly and vertically banded. Body large, plump, cylindrical, tapering anteriorly on the thoracic segments, banded conspicuously with numerous alternating transverse gaily-coloured stripes; naked, or a few of the segments bearing erect, slender, fleshy, laterodorsal filaments of greater or lesser length.

“CHRYSLIS.—Generally short and very stout, rounded, with very few projections; tapering very rapidly over the whole or posterior part of the abdomen to the long and slender cremaster; head scarcely produced in front, the anterior curve of the body very high, the thorax and abdomen separated by a slight and broad hollowing; appendages of the head and thorax not raised in the slightest above the general curve of the body.” (Scudder, *l. c.* p. 703.)

ACCESSARY SEXUAL PECULIARITIES IN THE IMAGO.—The butterflies of the subfamily Euploëinae are not only remarkable for the possession by both sexes of a pungent odour pervading the juices of their bodies, and to which they owe the freedom of existence that they enjoy from the attacks of insectivorous birds and reptiles, but in addition to this common protective odour, the males in most genera are furnished with a pair (in *Hestia* with two pairs) of extensible sac-like fingers bristling with hairs, which are protruded from beneath the anal segment and from which an odour is emitted, said by Dr. Fritz Müller, in the case of the American *Anosia plexippus* to be rather disagreeable when the processes were fully extended, and by Mr. De Nicéville (*J. A. S. Beng.* 1885, 41) in the case of two Indian species, *C. Core* and *P. Kollari*, who says, “Both species have a very strong but not actually disagreeable odour. The males of both species may often be observed patrolling a small aerial space with the end of the abdomen curled under the body towards the thorax, and with the two beautiful yellow anal tufts of long hair distended to their fullest extent at right angles to the body. It

seems very probable that these tufts or brushes of hair are used like holy-water sprinklers (*Aspergilli*) for disseminating the scent with which their bodies are charged as an attraction for the females or to warn off their enemies; but it should be observed that the females are similarly odoriferous, though they are unfurnished with the male disseminating organs." What is still more extraordinary, in many genera of the group *Limnaina*, the males also possess one or more little pouches upon the surface of the hindwings, variously situated between the lower veins, from the '*Androconia*' or scent-scales within which an odour is emitted different from that common to the butterfly. So, also, in many genera of the group *Euploëina*, the males have a longitudinal patch of *Androconia* or scent-scales situated between the lower median and submedian veins on the upper surface of the front wings, whilst other genera have in addition to this longitudinal patch an enlarged patch of specialized (presumably scented) scales on the upper side of the hindwing where it is overlapped by the front-wing. Other genera, again, are in possession of two of these longitudinal patches of scent-scales.

GENERAL DISTRIBUTION AND CHARACTERISTICS.—"The butterflies of this subfamily are almost entirely confined to the equatorial regions of Asia and America, but very few genera, poorly represented in species, occurring outside these districts, the paleogean forms belong, as a rule, to distinct genera from those found in the New World, and form a group apart from the Neogean genera as arranged by systematists. The single genus *Anosia* forms a striking exception to this rule, for although originally peculiar to the New World and widely distributed therein, it belongs to the Old World type.

"The species of *Euploëinæ* are invariably very numerous in individuals on both continents, and, as proved mainly by the researches of Messrs. Bates, Wallace, Fritz Müller, and Trimen, are the objects of unconscious mimicry by other butterflies, and by one another to an extraordinary extent" (Scudder, *l. c.*). Of this latter form of mimicry, several tables enumerating many such cases among the related Asiatic genera in the two groups *Limnaina* and *Euploëina*, are given (P. Z. S. 1883, pp. 207—212) in my monograph of this subfamily. "These butterflies have elongated and rounded wings. The palpi and antennæ are rather short, the abdomen of unusual length, and the legs long and stout, the perfect ones furnished only with closely appressed scales; the integument of the body is tough and elastic. The male abdomen is furnished at the tip with extensible pencils of long straight hairs."

"The caterpillars are stout, fleshy and cylindrical, tapering anteriorly. In the Old World type always, in the New World sometimes, two or more segments are furnished above with a pair of long, slender, flexible, tapering filaments, forming a characteristic feature. According to Mr. Wood-Mason the anterior pair "are articulated and freely movable at the base and function as antennæ." (Butt. of India, i. 22), but

there is certainly nothing which can be called articulation in our American species, though they are freely movable. The larvæ are rapid eaters and feed, the Old World type or *Limnæidi* (to which the North American species belongs), on Asclepiadaceæ, the New World type, or *Ithomyidi*, on Solanaceæ.

"They are on the wing throughout the year in the warmer parts of America, and pass through several successive broods, wintering farther north in the wing state.

"The chrysalids are always suspended by the hinder extremity, and are usually green or yellow and marked with golden spots or streaks. (Scudder, *l. c.* p. 703.)

GENERAL HABITS.—Mr. De Nicéville (Butt. Ind. i. 22) writes: "These are butterflies of slow flapping flight when undisturbed, and of fearless demeanour. They include some of the very commonest of Indian butterflies, and the commoner species are not only widespread, but they occur in most parts in very great numbers. Their fearlessness is evidently the result of the freedom that they enjoy from the attacks of insectivorous birds and reptiles, which they owe to the presence of a pungent semi-aromatic odour pervading the juices of their bodies; these juices, when exuded by pressure, stain the skin yellow and leave a distinct odour; their bodies are moreover very tough and leathery, and they have great tenacity of life, so that any individual which might be accidentally seized and afterwards dropped by a bird, has a good chance of escaping with immunity when more delicately framed insects would be killed or hopelessly maimed. The males often bear curious sexual marks on the wings, and have besides, the power of extruding and expanding two long brushes of yellow hairs from their anal extremity, which have been thought to disseminate the odour with which the insects are furnished. In connection with the immunity from persecution which these insects enjoy, it is worthy of note that many species belonging to widely different genera, such as *Elymnias*, *Hypolimnas*, some of the *Pierina*, *Papilionina*, &c., which altogether lack this (odorous) kind of protection, are found to closely resemble in outward appearance and style of coloration certain species of Euplocinæ which frequent the same localities at the same periods; such genera are termed 'mimetic,' with reference to this habit of mimicry."

Regarding the gregarious habits of these insects, Dr. Thwaites (Lep. Ceylon, i. p. 1) writes from Ceylon: "The number of Ceylonese species in this subfamily is not very considerable, though some of them, especially of the Euplocinæ, are extremely numerous in individuals. These are, moreover, strikingly interesting on account of their mode of flight and gregarious habits. On a fine sunny day, when calm or nearly so, amazing numbers of one or more species of Euplocæ may often be observed wending their way in one direction, as if floating upon the air a few feet from the ground, with an apparently sluggish movement of their wings, though really making rapid progress. Resembling an army in scattered open column, they move on

instinctively, regularly and simultaneously, as if animated by a true migratory impulse. They naturally suggest a most interesting inquiry as to whence these immense numbers come and whither they are tending, whether their course is a straight-ahead one, or is following a horizontal circular direction of greater or lesser diameter. These insects when thus moving in company show an unwillingness to be diverted from their course, and when attracted by a favourite plant in flower, it is only for a few minutes that they remain upon it, and after regaling themselves, soon start off to resume their journey with their fellow-travellers, moving again amongst them as before and bound for the same destination. It is curious to observe that butterflies of a totally different kind, when they happen to come within the range of one of these moving columns, are for a period carried away apparently by the same impulse and fly in company with it, but are soon seen to be moving off independently as at first. Reverting to the Euplœas, these insects when stopping for a short time to refresh themselves upon an attractive flower, are with little difficulty captured by the hand, and then simulate death for a few seconds, soon flying away. They are so tenacious of life as to be able to bear considerable pressure between the finger and thumb without being killed; they exert at the time a peculiar long silky anal appendage of a bright yellow colour, which is almost immediately retracted into its sheath. Birds and other insectivorous animals do not appear to be partial to these butterflies as food; they are probably unpalatable to them owing to their possessing a peculiar odour. The larvæ I have most frequently found feeding upon leaves of the species of *Ficus* and *Dogbane*. The suspended chrysalids are brilliantly metallic in colouring." Mr. De Nicéville (*Butt. Ind.* i. 22) also writes that "Capt. C. H. E. Adamson on one occasion near Moulmein, on the 12th June, found hundreds of *Euplœa* of numerous species, all congregated round a single flowering tree in the jungle, at a time when scarcely a single *Euplœa* was to be found elsewhere in the neighbourhood. Mr. H. Fergusson has observed much the same habit in *Hestia* [*malabarica*], and every one who has paid attention to the subject must have observed the swarms of the common *Danaïs chrysippus*, *D. Genutia*, and *Euplœa Core* to be found from time to time in various localities."

The flight of these butterflies, according to Mr. Scudder (*l. c.* 703) is powerful and sustained, although generally rather slow. They often sail high in the air on expanded wing. The species are exceptionally numerous in individuals, and some are known to migrate.

VARIOUS MIMICKS OF THE EUPLEINÆ.—"*Limnas chrysippus*, like all the Eupleïnæ group, is a butterfly that no bird or lizard will touch. It is an insect common all over India, Burma, and Ceylon, the Philippines, Turkey, Madagascar, Arabia, the W.S. and S.E. coast of Africa, and in all these places (? in Turkey) the protected females of *Hypolimnas misippus* are also to be found. In Aden and in several parts

of Africa, the form named *L. Alcippus* occurs, and in all such places the protected form of the female of *H. Misippus* is found with white hindwings; and in Aden, as well as in parts of the interior of Africa, and also on the Kutch coast in Sind, there is a form of *L. Chrysippus*, without the black apical patch to the forewings, named *L. Dorippus* [*L. Klugii*, Butler], and in these places the female of *H. Misippus* is also similarly coloured and marked. This form of the female of *H. Misippus* is frequently to be seen in Bombay and other parts of India, and it is not at all uncommon, though not nearly so plentiful as the *L. Chrysippus* form of female. On observing this I have for some years collected all the *L. Chrysippus* I could, in the expectation of getting some *L. Dorippus* [*Klugii*, Butler], and in this I have not been disappointed, and have now specimens in my collection from Bombay, Poona, Khandalla, and from the Punjab. It (*L. Klugii*) is, however, nothing like so common as the female of *H. Misippus*, which mimics this form, reversing the rule that the imitating species are comparatively rare whilst the imitated swarm in large numbers; but this only shows that in former ages, in these places, the form *L. dorippus* [*Klugii*] was a common form, and that it has gradually been dying out and is now very nearly extinct. On the principle that mimicry is merely for protection, and that the protected butterflies are those most abundant, we would here in India naturally expect to find the several species of the subfamilies Euploëina and Limnaina more frequently mimicked than in any other kind, because many of the species of both these subfamilies are to be found in great abundance in most parts of India, and all are distasteful to birds, lizards, &c., and this is actually the case. First we will take the Euploëina, of which the common form is *E. Core*. It has many allies all over India, and its allies are more or less closely mimicked by several species of Papilioninæ—*Papilio panope*, *P. Clytia*, *P. dravidarum*, and the female of *P. Castor*, also *P. taroyana*, which exactly mimics *E. Alcathe* from the same parts. Other butterflies which also mimic the Euploëina, is the female of *Hypolimnas kolina* the *Euripus Halitherses*, the females of which mimic *E. rhadamanthus* (and the males have a fair resemblance to *T. limniace*), of the subfamily Nymphalinae. In the subfamily Elymninae are *Elymnias leucocyma* and *Dyctis patna*, the sexes of which mimic the same sexes of *E. Midamus* [Linnei]. Amongst the moths are two species of Amesia, of the family Chalcosiidæ, *A. aliris*, which mimics the male, and *A. midama* which mimics both the sexes of *E. midamus* [Linnei]. In the red Limnaina, we have *L. Chrysippus* and allies, the females of *Hypolimnas Misippus* mimicking all these as before stated. Then we have *S. Genutia* mimicked by the females of three different species of Elymnias, i.e. *E. fraterna*, in Ceylon, *E. caudata* in S. India, and *E. undularis* with white hindwings the *S. Hegesippus*, in Burma. *Caduga tytia* is mimicked by both sexes of *Hestina nama*, by *Papilio Agestor* and *P. Xenocles* in Sikkim, and by its allies *P. Govindra* or *P.*

Epycides in the N.W. Himalayas." (Swinhoe, J. Bombay Nat. Hist. Soc., 1887, 171.)

DIVISIONS OF SUBFAMILY.—The subfamily Euploeinæ is divisible into three well-marked and characterized groups. The first is peculiar to the Western Hemisphere and comprise the American "Danaoid Heliconidæ" of Bates, for the study of which we refer our readers to his memoir on that group, published in the Transactions of the Linnean Society of London, 1862, pp. 495—566. The other two groups "Limnaina," and "Euploeina," belong to the Eastern Hemisphere.

Of one of the genera of Limnaina, namely *Anosia* (and of which the well-known *A. plexippus* is the type) all the species are American, the genus strictly belonging to the Old World division of this subfamily. It may be conveniently noted here, that certain species of the genus *Hamadryas* (of which six or more are described as inhabiting various Eastern islands of the Malay Archipelago, Australia and New Zealand) belonging to the second group, Euploeina, are mimicked in New Zealand, Australia and in the Malay Islands by species of the genus *Neptis*, and it is curious that *Neptis Shepherdii*, an Australian species, with *N. Cerne*, *N. heliodora*, and *N. latifasciata*, approach considerably in form and pattern of markings to the South American Heliconid *Tithorea bonplandii*. This resemblance of the Australian *Neptis* to the South American *Tithorea* is an interesting fact, inasmuch, as *Hamadryas* is an isolated Asiatic genus having no Eastern closely allied forms, and that it has a great resemblance to some forms of South American *Ithomias*, viz. the genus *Leucothyris*, &c.

Key to the Asiatic groups of EUPLOEINÆ, based on the sexual marks.

Sexual marks, or patches of scent-producing scales, in male.

- | | |
|---|------------|
| A. When present, situated on the hindwing | LIMNAINA. |
| B. When present, situated on the forewing, or on both the fore and hindwing | EUPLOEINA. |

GROUP LIMNAINA.

Limnaina, Moore, Proc. Zool. Soc. Lond. 1883, p. 214.

IMAGO.—Males, in addition to the abdomen being furnished with extensible odoriferous anal tufts of hairs, most genera possess one or more pouches concealing scent-producing scales or "androconia," on the upper side of the hindwing. Hindwing also mostly with a more or less defined precostal cell. Claws with, or without, paronychialia and pulvilli.

ADULT CATERPILLAR with two, or more, pairs of subdorsal long slender fleshy processes.

Key to the Indian genera of LIMNAINA, based on the presence and position of the sexual mark.

A. No sexual mark or patch of scent-producing scales, in male.

- | | |
|---|---------|
| a. Wings large, elongated, diaphanous-white, spotted with black | HESTIA. |
| b. Wings of moderate size, black, with bluish-white spots and streaks | RADENA. |

- B. *One sexual mark* or pouch enclosing scent-producing scales *between* median and submedian vein on hindwing, in male.
- a. Wings of moderate size, black, with bluish-white spots and streaks TIRUMALA.
 - b. Wings ferruginous, veins not lined with black LIMNAS.
 - c. Wings ferruginous, veins lined with black SALATURA.
- C. *Two sexual marks*, or spatular-shaped patches of scent-producing scales, in male.
- I. *Upon* the median and submedian vein.
 - a. Wings small, black, with yellowish spots and streaks BAHORA.
 - b. Wings moderate sized, with whitish spots and streaks PARANTICA.
 - II. *Upon* the submedian and internal vein.
 - a. Forewings elongated, black; hindwings red or purple-red, markings broad and greyish-white CADUGA.
 - b. Fore and hindwings triangular, black, markings slender, white BADACARA.
 - c. Wings short, black, markings white, much restricted CHITTIRA.

GENUS HESTIA.

Hestia, Hübner, Verz. bek. Schmett. p. 15 (1816); Doubleday and Hewitson, Gen. Diurnal Lep. p. 94 (1847); Scudder, Proc. Amer. Acad. Arts and Sci. 1875, p. 189; Moore, Proc. Zool. Soc. Lond. 1883, p. 217; Distant, Rhopalocera Malayana, p. 5 (1882); Marshall and De Nicéville, Butt. of India, i. p. 23 (1882).

Nectaria (part) Moore, Lepidoptera of Ceylon, i. p. 2 (1881).

IMAGO.—Wings semidiaphanous, large. *Forewing* long, narrow, somewhat fusiform; anterior margin much arched, apex rounded; exterior margin very oblique and slightly concave in the middle; posterior angle much rounded; costal vein extending to half length of the margin; first subcostal branch emitted at one-fifth before end of the cell and joined to the costal near its end by a short inwardly-directed cross branch; second subcostal branch from near end of the cell, third and fourth at equal distances beyond the cell, fifth branch terminating below the apex; cell long, extending to more than half length of the wing; upper discocellular vein inwardly oblique, deeply concave, lower outwardly convex; upper radial starting from the discocellular near the subcostal, lower radial from a slight angle at equal distance between it and the upper median veinlet; median vein with three widely separated branches; submedian vein recurved, and emitting a short, slender, straight lower veinlet from near its base. *Hindwing* fusiform, somewhat narrow; anterior margin much arched, apex produced and rounded; exterior margin very oblique; cell more than half its length, rather narrow; costal vein very convex, short; precostal forked; subcostal veinlets wide apart, first branch much upwardly curved, second branch nearly straight and extending to the prolonged apex; discocellular vein bent downward beyond its middle, the radial being emitted from the angle; median veinlets wide apart, straight, the two lower from opposite distances to the subcostals; submedian vein slightly, and inner vein much recurved. *Cilia* extremely short. Body long, abdomen slender. *Palpi* ascending to near the vertex, apex projecting in

front, flattened along its entire outer side and there clothed with very short adpressed scales, inner side of first and second branch clothed with longish hairs which project downward, which are longest at the base and towards the end, upper outer-edge clothed with a compact crest of forward-projecting hairs which increase in length to end of second joint, where the crest forms a prominent point and sends forth some shorter projecting hairs over the apex, third joint short, slightly decumbent, pointed in front, clothed with short stout hairy scales; lower edge of first and base of second joint clothed with longer hairs. *Antennæ* long, slender, very slightly thickened towards the end. *Forelegs* aborted in both sexes; fore tarsus very short, scaly, in the male cylindric and pointed, in the female spatular and furnished along the tip with three opposite pairs of short stout spurs, giving it the appearance of a miniature mole's foot; middle and hindlegs long, slender, smoothly clothed above; the tibiæ and tarsi spiny beneath, the former each with two short straight terminal spurs, the latter each with two apical curved claws. *Abdomen of male* furnished at the apex with four extensible pencils of long hairs, each pencil, in the dried insect,* being exerted from an independent tubular sheath, projecting from the superior lateral apex of the abdomen between the integument and the coriaceous conchiform claspers.

LARVA.—Cylindrical, naked, banded with several transversely alternating conspicuous colours; furnished with four pairs of long fleshy filamentous processes or tentacula.

Type H. Lynceus.

GENERAL CHARACTERISTICS AND HABITS.—"The species of *Hestia* are remarkable butterflies, of large size and with elongated wings; they are essentially tropical insects. All the known species are from the Indian or Indo-Malayan regions. Within our limits they are confined to the South of the Peninsula and along the Western Ghâts to the South Konkan, Ceylon, Andaman Islands, and Burma. The texture of the wings is extremely delicate, and the colour throughout the group is semi-transparent white or greyish-white, sometimes pure, sometimes slightly powdered with minute blackish scales, and sometimes sullied with smoky-brown,

* In the dried specimens of the Bornean species *H. Lynceus* I have been able to find *only two* of these exerted pencils of hairs, one on each side of apex of the abdomen, but in specimens of *H. malabarica*, and the Sumatran *H. Druryi*, I have examples showing two pairs of these exerted pencils, a pair projecting, one above the other, from separate sheaths, on each side of the apex of the abdomen, the upper pencil being the longest. These pencils of hairs are to be seen in the dried specimens only when left exerted at time of the death of the insect, and in most cases it would appear that only the two upper pencils are left exerted, but when the four are protruded they stand out prominently. Mr. Doherty (Journ. Asiat. Soc. Bengal, 1886, p. 109) also gives four, as the number of these tufts in the male *Hestia*.

with the veins and numerous spots and marks black. They fly slowly over the tops of bushes and trees, often at considerable height from the ground, but when within reach are not difficult to capture. They are essentially forest-loving insects, and frequent the neighbourhood of pools and streams. Locally they are known by various trivial names, such as 'floater,' or 'silver paper fly,' or 'sylph,' in Ceylon, 'spectre' or 'ghost,' in South India." (Butt. Ind. i. p. 23.)

Six species of *Hestia* occur within our area, the transformations of only one species of this genus being at present known, that of *H. Malabarica*, and of which we give illustrations on plates 1 and 2. The name of the food plant of this species is unknown.

HESTIA MALABARICA.—(Plate 1, fig. 1, 1a; larva and pupa 1b, 1c., ♂, ♀.)

Hestia Malabarica, Moore, Annals and Mag. of Natural History, 1877, p. 46; *id.* Proc. Zool. Soc. Lond., 1883, p. 220; Hampson, Journ. Asiat. Soc., Beng., 1888, p. 347.

Hesta lynceus apud Marshall and De Nicéville, Butt. of India, &c., p. 25 (1888) *nec Drury*.

IMAGO.—Male and female. Wings semi-transparent, dusky greyish white, upper and underside, with the veins and their immediate borders, and all the markings black. *Forewing* with black interspace between the margin and costal vein from the base to about one-third the length of the wing, where it merges into a spot crossing to the subcostal vein; beyond this is a short marginal black bar before the end of the costal vein, which also merges into a lower spot and extends broadly across the end of the cell; within the cell are three black lines extending from the base to the end, the upper line starting from near the base of the subcostal, the two lower lines from the base of the cell, and are united for some distance at their base, crossing these lines beyond the middle of the cell is a large irregular-shaped patch which sometimes touches the subcostal vein, but not the median; a medial discal transverse series of seven spots, of which the three lower are the largest and cordate, the others oval, the two upper being confluent and extend inwardly to the costa, the two cordate spots between the median veins sometimes extending their upper end to the vein; a smaller rounded inner spot between the middle and lower median veins; between the base of the lower median vein and the submedian is a large outwardly oblique crutch-shaped spot extending inward to the base in a decreasing streak and from which outwardly a line extends through the lower discal spot to the exterior marginal spot; beyond the discal series is a submarginal row of biconical spots, each pair divided by a vein and continued in a broad outwardly-dilated peduncle to the exterior margin on both sides of the end of each vein, except on the submedian vein where the peduncle is formed only on its anterior end, the anterior biconical spots being less regularly formed; between the bases of these biconical marks is a marginal row of conical spots. *Hindwing* with correspondingly disposed and similar

shaped markings, except that there are two rounded spots between the costal and subcostal vein, a curved series of six discal spots which are mostly oval in shape, the two inner discal spots being smaller, the upper half of the biconical spot on the discocellular and that on the second subcostal veinlet is extended inward along the vein and appears beyond its lower half; within the cell the black lines differ, the upper one starting as a short spur from the central spot. Extreme marginal line round both wings black; cilia white edged. Female differs from the male only in having somewhat broader wings. *Body*, palpi above, and legs, black; abdomen beneath white with brown segmental bands; head and thorax spotted and striped with white; palpi in front and on outer sides, and femora beneath white. *Male* furnished with two pairs of exertible pencils of hairs, each pencil being protruded from an independent tubular sheath, and when exerted are projected from between the base of the abdominal integument and a prominent pair of yellow coriaceous conchiform clasping organs.

Expanse 5 to $5\frac{1}{2}$ inches.

EGG.—“White; oval; attached singly to a leaf; marked with longitudinal rows of hexagonal indentations” (*Macpherson*).

ADULT CATERPILLAR.—Cylindrical, naked, about two inches in length, tapering slightly towards the anterior extremity; head small, black; the segments with alternating broad black and narrow white transverse bands, and bearing four pairs of long black fleshy filaments, three of the pairs being disposed on the anterior segments, and one pair on the posterior segment; on the second segment are two small black dorsal spots; spiracles bright red; legs black.

CHRYsalis.—Suspended by the tail. About one inch long; body dorsally curved, thorax rounded posteriorly, head bluntly pointed, wing-cases large; golden-yellow colour, body transversely marked with black stripes and spots, the thorax and wing-cases with longitudinal stripes and spots.

HABITAT.—Malabar (Wynaad); Travancore; Nilgiris; Mysore.

The larva and pupa of *H. Malabarica* figured on our plate 1, figs. 1, 1a, are copies of drawings made by Mr. S. N. Ward, from specimens which he succeeded in rearing during his residence in Malabar, and to whom I am also indebted for the type specimens of this insect.

LIFE HISTORY.—The larva and pupa figured on our plate 2, fig. 1, 1a, are also those of *H. Malabarica*, and are copied from the drawings made by Mrs. Mary Hamilton, now in the Library of the Entomological Society of London, who, in a letter dated, “Madras, September 1st, 1860,” informed me that “The larva was found on the Western Ghâts, about half way up the Kotiaddy Pass. The imago being very plentiful along the top of the Ghâts, but difficult to capture, as it always flies high. On referring to my original notes I find that this larva became a pupa

on the 24th of December, 1849, and that the perfect insect came out on the 11th of January, 1850. The plant on which it fed was unknown to me by name."

The only other authentically recorded instance of the rearing of this butterfly is that by Captain T. Macpherson, who published the following very interesting account (Journal of the Bombay Natural History Society, 1887, p. 164), accompanying it by a rough, though characteristic drawing of the larva, pupa, and egg: "As nothing is known regarding the early history of *H. Malabarica*, it may interest members of the Society to learn that I have succeeded in rearing it from the eggs. On the 28th of February last, I was in camp at Devimani on the Kanara Ghauts. On the afternoon of that day, whilst walking through a patch of evergreen forest, I noticed a female *Hestia*, apparently intent on finding a place to deposit her eggs. I therefore stood still and watched her. She fluttered about for a considerable time round a tree that was thickly covered by a creeper with large cordate leaves. At last she settled on one of these leaves and deposited an egg on the under surface. This I quickly secured, and on a careful examination of a number of other leaves of the same plant, I discovered some eight or ten more freshly deposited eggs. The egg is always deposited singly on the under surface of the leaf; it is white, oval, about $\frac{1}{16}$ inch long by $\frac{1}{32}$ broad, attached to the leaf by one of the small ends and marked with about twenty-two longitudinal rows of hexagonal indentations. The eggs hatched out in from six to seven days, and about two days before the grub emerged its black head could be distinctly seen through the thin shell. The larva emerges from a little to one side of the apex of the egg, eating only a small hole sufficient for its exit; it then eats its cast-off shell for its first meal. On emerging the grub is about $\frac{3}{16}$ inch long, skin transparent pale yellow, head and feet black, and through the skin are visible the white rings of the more mature grub, also the two black dots on the back of the second segment. It has four minute pairs of fleshy tentacles arranged as in the more mature grub.

"In a few days the first skin is cast and the grub then assumes the colours and markings which it retains until it changes to pupa. It eats its cast skin in the first two changes only. The young grub has the peculiar habit of eating holes in the centre of the leaf instead of from the margin inwards, as with most caterpillars, but this habit it gives up as it increases in size. It conceals itself generally on the under surface of the leaf.

"In from twenty to twenty-five days it attains to full size, and is then about two inches long, cylindrical, slightly tapering towards the extremities, provided with four pairs of black fleshy tentacles about one-quarter inch long, one pair being on the third, fourth, sixth and twelfth segments; skin smooth, glossy, head black, second segment white with two small dots on the back; all the other segments white with a broad band of black round the centre of each; legs black. Segments six, seven,

eight, nine, ten and eleven have on each side of the black ground small round patches of bright scarlet, particularly distinct on the sixth and eleventh segments; belly black. On attaining its full size the grub spins a small pad of silk on the under surface of a leaf, attaching its last pair of legs firmly to this pad and hanging thus freely suspended head downwards; it remains thus for about twenty-four hours, when it casts its skin and changes to pupa. The pupa is naked, hanging freely suspended; it is one inch long by $\frac{7}{16}$ inch broad; colour golden-yellow, with large patches of bright metallic gold, the black spots on the wings of the butterfly showing through the yellow parts of the chrysalis. In twelve or thirteen days the pupa loses its brilliant colouring and metallic lustre and turns black, and about twenty-four hours later the butterfly emerges. The food-plant I could not define; the creeper was unfortunately not in flower, nor could I find any seeds."

DISTRIBUTION AND HABITS.—In his "Notes," Mr. S. N. Ward states that this butterfly is "found in woody places on the Western Coast and especially on the thick-wooded mountain passes on the Western Ghâts and Nilgiris," and that the "larva is very rarely to be met with." According to De Nicéville (Butt. of India, &c., i. p. 25), it appears to be fairly common in the Ashamboos Hills, Travancore, but is rather local. Mr. Harold Fergusson writes, "On one occasion, on the 16th of February, in a patch of heavy forest, at about 3500 feet elevation, I saw numbers of this *Hestia*. There must have been at least a hundred floating about the trees some twenty feet from the ground. I had seen none before this in any of the other forests, so I should think they must be local. Later on, during April they were not uncommon, but seldom numerous, and throughout May they were common in the hills in suitable localities. They seem to occur only on the hills, not lower than 1000 feet elevation, and to frequent forests. In the Kowdiar District, Travancore, Mr. Bourdillon obtained specimens at 2200 to 2600 feet, in April." On the western slopes of the Nilgiris, at 2500 feet elevation, Mr. Hampson captured specimens in September. "In the Kadur District, Mysore, at about 2500 feet elevation, it has been found common in August, October, and November, by Mr. G. H. Kearney" (Butt. Ind. 25).

Mr. E. L. Arnold, in his work "On the Indian Hills," p. 194, describes its habits as "water-loving." . . . "Their favourite habit is to lazily flap their wings while ascending to the tops of the trees, and then, keeping their wings spread out to the full on either side, they let themselves come slowly sailing down in wide circles, like large white blossoms, until just at the surface of the water, when they flutter over their own bright reflection for a moment, and again rise up to the tree-tops."

HESTIA KANARENSIS (PLATE 2, FIG. 2, 2a, ♂, ♀).

Hestia malabarica (pars), Marshall and De Nicéville, Butt. of India, &c., i. p. 26 (1882).

IMAGO.—Male and female. Wings semi-transparent bluish-white. Upper and

underside with the veins and markings black, the markings correspondingly disposed and similarly shaped as in *H. Malabarica*. Both wings, however, have the veins more slenderly black lined, and all the markings are smaller, being about half the size of those in that species.

Expanse, $4\frac{1}{4}$ to $4\frac{3}{4}$ inches.

HABITAT.—North Kanara ; South Konkan.

DISTRIBUTION.—Occurs in North Kanara, also, according to Mr. De Nicéville, in the northern portions of the Western Ghâts in the South Konkan, and on the Goanese frontier. It appears to be common towards the end of March on the wooded Passes in the S. Konkan ; a number of them were found [by Mr. G. Vidal] on the Onomed and Koessi Passes at about 1600 to 1700 feet elevation in that month. Specimens were captured at Supa, N. Kanara, in January and February by Mr. Wise.

HESTIA JASONIA (PLATE 3, FIG. 1, 1a ♂, 1b ♀).

Hestia Jasonia, Westwood, Cabinet of Oriental Entomology, p. 87, pl. 42, fig. 1, ♂ (1848). Butler, Trans. Ent. Soc. Lond. 1867, p. 470. Marshall and De Nicéville, Butterflies of India, &c., p. 27, plate 3, fig. 1, ♂ (1882). Moore, Proc. Zool. Soc. Lond. 1883, p. 219.

Nectaria Jasonia, Moore, Lepidoptera of Ceylon, 1, p. 3, plate 1, fig. 1 (1880).

IMAGO.—Male and female. Wings semi-transparent, of variable tint of colour in both sexes, some specimens being greyish-white, others more or less fuliginous-white, and some pale fuliginous-brown ; all the veins with their immediate borders, and the markings black. *Forewing* with a black basal costal border, merging into an oblique irregular broad band across the cell ; the cell traversed by three slender lines from base to end ; a short streak on middle of the costa ; an acutely-angled zigzag broad streak across end of the cell ; a large inner discal spot which touches the base of the middle and the lower median veinlets ; an outwardly-oblique crutch-shaped mark below the base of lower median veinlet, which extends by a lengthened streak to the base of the median vein ; a discal series of seven angulated spots, of which the three lower are quadrangular, and the angles of the two lowest generally (and especially in the dark-tinted specimens) touching the veins and the inner spots ; the third spot—situated between the upper and middle median veinlets—always being narrowly quadrate and inwardly-oblique in position, the three upper spots are the longest and partly coalesced ; a submarginal series of biconical spots terminating outward in a dilated streak at end of each vein, between which is a marginal row of conical spots. *Hindwing* with three slender black lines within the cell, the upper ones starting from the round central spot ; two inner discal small spots, of which the lower is a duplex one, being divided by the black streak extending from the base between the median and submedian veins ; a discal series of eight angulated-oval spots, two of which are between the costal and subcostal veins ; a submarginal series

of biconical spots terminating outwardly in a dilated streak at end of each vein, between which is a marginal series of conical spots. *Body* and legs black; head and thorax spotted with white; thorax above, palpi in front, and femora beneath streaked with white; abdomen black above, white beneath.

Expanse, $4\frac{3}{4}$ to $5\frac{3}{4}$ inches.

LARVA.—Unknown.

HABITAT.—Ceylon.

A discriminating character between this species and its nearest ally, *H. Malabarica*, is in the form of the lower discal spots on the forewing—which in *H. Jasonia* are always quadrangular, and in the other, cordate; and also in the zigzag streak crossing the end of the cell having its lower outer angle always sharply extended between the radial and upper median veinlet.

HAUNTS AND HABITS.—According to Sir Emerson Tennent (Nat. Hist. of Ceylon, i. 426) “this butterfly is called by Europeans in Ceylon by the various names of Floater, Spectre, and Silver-paper-fly, as indicative of its graceful flight. It is found only in the deep shade of the damp forest, usually frequenting the vicinity of pools of water and cascades, about which it sails heedless of the spray, the moisture of which may even be beneficial in preserving the elasticity of its thin and delicate wings, that bend and undulate in the act of flight.” Dr. Thwaites states that it “affects the glades of woods, and is notable for its graceful flight, rising and descending almost like a gossamer in the air, and well deserving the name of the Sylph, which is commonly given to it.” Another correspondent, Capt. F. J. Hutchison, writes that “In the forests and especially about waterfalls in the Western, Central, and Southern Provinces, this butterfly may be found all the year. It has a very slow floating flight, often poising nearly motionless, and is easily caught.” Specimens of both the pale and dark tinted examples of *H. Jasonia*, collected by Mr. E. E. Green in 1884, each bear the month of April as the date of their capture.

HESTIA AGAMARSCHANA (PLATE 4, FIG. 1, ♂).

Hestia Agamarschana, Felder, Reise Novara, Lep. I. p. 351, pl. 43, fig. 7, ♂ (1867); Butler, Trans. Ent. Soc. Lond. 1867, p. 470; Moore, Proc. Zool. Soc. Lond. 1877, p. 582; *id.* 1883, p. 219; Marshall and De Nicéville, Butt. of India, &c., p. 27 (1882).

IMAGO.—Wings semi-transparent; greyish-white, the female somewhat fuliginous-white; veins and markings black. *Forewing* with the costal base broadly black, merging into a large spot within the cell; the traversing cell lines broad, and present only from the base to the spot, their continuation from the outer edge of the spot to the end of the cell (as in other species of the genus) being entirely absent in both sexes; a medial costal spot and an irregular streak across end of the cell; an inverted conical inner discal spot, an elongated clavate mark below the median vein and a streak along middle of the posterior margin, a discal series of

oval spots of which the four upper are elongated and partly coalesced; a submarginal series of biconical spots with outer dilated peduncles, and a marginal row of conical spots. *Hindwing* with black traversing cell lines and spot towards its end; an inner discal spot between the middle and lower median veinlets, inner discal spot between the median and submedian veins absent in the type, a curved discal series of eight oval spots, two of which are below the costal border, and the lowest cordate in shape; the ordinary submarginal biconical spots with outer dilated ends on the veins, and a marginal row of conical spots; a slender streak between the median and submedian veins. *Body* and legs black, spotted and striped with white; abdomen black above, white beneath.

Expanse, $3\frac{1}{2}$ to 4 inches.

HABITAT.—Andaman Isles (*Felder*); Mergui; Arrakan.

DISTRIBUTION.—Our illustration (Pl. 4, fig. 1) of this butterfly is copied from *Felder's* figure. No other example has been recorded from the Andaman Isles.

According to Mr. De Nicéville (*Butt. Ind. i. 28*), "Three males and a female, which evidently belong to this species, were taken in the Mergui Archipelago in December and January, by Dr. Anderson; these differing from the type in being a little larger, and in having the black spot near the middle of the streak between the median and submedian veins of the hindwing. The female differing from the male in the forewing being wider and less emarginate externally; and in all the black markings of both wings being smaller, leaving a greater extent of the pure white ground colour."

Specimens have also been obtained at Akyab, in Arrakan. A female from the latter locality, in the "Hewitson Collection" at the British Museum, has the wings of a slightly fuliginous tint, the shape and positions of the black markings being the same as in *Felder's* figure, but the markings are not so strongly defined, the submarginal series slightly coalescing, and those at the apex of forewing are coalesced with those of the marginal series.

HESTIA CADELLII (PLATE 4, FIG. 2, ♂).

Hestia Cadelli, Wood-Mason and De Nicéville, *Journ. Asiat. Soc. Bengal*, 1880, p. 225, pl. 13, fig. 1, ♂; *id.* 1881, p. 244, ♂; Marshall and De Nicéville, *Butt. of India*, &c., p. 28, pl. 4, fig. 2, ♂ (1882); Moore, *Proc. Zool. Soc. Lond.* 1883, p. 219; Staudinger, *Exot. Schmett.* p. 47, pl. 24 ♂ (1885).

IMAGO.—Male and female. Wings dusky greyish-white; all the veins and markings intensely black and prominent. *Forewing* with the black costal base coalesced with the ordinary basal cell-lines and the large central spot, and also almost with the base of the median vein and with the lower large elongated mark, together with the posterior border, thus covering the entire basal area, excepting the pale dusky

streak left above and below the median vein; terminal lines within the cell slender and present in both sexes; inner discal spot between the base of the middle and lower median veinlets coalesced with the cell spot; lower discal spots rounded, the upper spots elongated and coalesced; the anterior half of the costal border also black; submarginal biconical spots broad, with short dilated peduncles, the biconical spots partially confluent, their peduncles completely coalesced with the marginal spots, except that on the lower median veinlet. *Hindwing* with broad cell lines and rounded spot, a curved series of eight oval discal spots, the lowest spot forming the club-point to the streak between the lower median and submedian vein; a small round inner discal spot between the middle and lower median veinlets; lower inner discal spot absent; submarginal biconical spots with their outer bases confluent with the marginal spots. *Body* and legs black, head and thorax spotted and striped with white; palpi in front and femora beneath white; abdomen above black, sides and beneath white with black segmental lateral dots.

Expanse, $4\frac{1}{2}$ to 5 inches.

HABITAT.—South Andamans.

DISTRIBUTION.—The type specimen of this species was obtained in the vicinity of Port Blair by Colonel T. Cadell, the Chief Commissioner of the Andamans and Nicobar Islands. The late Mr. F. A. de Roëpstorff also collected it in the same locality, in April. A large series of both sexes of this species collected by him, now in the Indian Museum, Calcutta, "according to Mr. De Nicéville (*l.c.* p. 29) show no variation whatever from the type, except in one or two specimens having an additional spot on the black streak in the interno-median area of the hindwing."

HESTIA HADENII (Plate 4, Fig. 3, ♀).

Hestia Hadeni, Wood-Mason and De Nicéville, Journ. Asiat. Soc. Bengal, 1880, p. 242, pl. 13, fig. 2, ♀. Marshall and De Nicéville, Butt. of India, i. p. 29, pl. 4, fig. 3, ♀ (1882). Moore, Proc. Zool. Soc. Lond. 1883, p. 219.

IMAGO.—Male and female. Wings pure white; veins and markings deep black. *Forewing* having the black costal base coalesced with the ordinary cell streaks and its large broad spot, the three terminal lines from the latter to end of the cell very slender but distinctly visible; the base of the median and submedian veins sharply black bordered, the club-shaped mark between the median and submedian veins well defined and free except at its lower outer end; two discal spots between the middle and lower median veinlets, and a small outer lower discal spot beyond the clavate mark; beyond, the entire outer border is wholly black, the ordinary submarginal and marginal markings forming one complete broad marginal band. *Hindwing* with a small round cell spot and traversing lines, a curved series of eight

small discal spots, an inner discal spot between the middle and lower median veinlets, and a streak between the median and submedian veins, the lower inner discal spot absent; beyond, the entire outer margin is broadly black, as in the forewing. Body and legs black; head and thorax spotted and striped with white; palpi in front, and femora beneath white; abdomen black above, the sides and beneath pure white with lateral segmental black dots.

Expanse, $5\frac{1}{4}$ inches.

HABITAT.—Burma.

DISTRIBUTION.—The type specimen was collected at Bassein in Pegu, by Mr. Algernon Haden. Other examples have since been obtained in the same district by Mr. Noble.

INDO-MALAYAN ALLIED HESTIAS.—The following topomorphic species have been described :—*Hestia Lynceus* (Drury, Illust. Exot. Ent. ii. pl. 7, f. 1), the type of the genus; with very elongated and narrow wings. Occurs only in Borneo.—*H. Stollii* (Cramer, Pap. Exot. v. pl. 42, f. 1); intermediate between *H. Lynceus* and *H. Reinwardti*, with shorter and narrower wings. *Hab.* Java.—*H. Reinwardti* (Moore, P.Z.S. 1883, p. 218), figured in Distant's *Rhopalocera Malayana*, pl. 1, fig. 2; both wings transversely broader and the hindwing shorter than in *H. Lynceus*. *Hab.* Malacca, Sumatra, Nias.—*H. Logani* (Moore, *l.c.* p. 218); wings narrower than in *H. Reinwardti*, and the hindwing more produced. *Hab.* Malacca, Pinang.—*H. Donovanii* (Moore, *l.c.* p. 218), a small species four and a half inches in expanse; wings with similar markings to *H. Lynceus*, but all of which are half their size. *Hab.* Singapore. *H. Druryi* (Moore, *l.c.* p. 219), figured in Doubleday and Hewitson's *Diurnal Lep.* pl. 13, f. 1; nearest to *H. Logani*, wings smaller, with more slenderly and less distinctly black lined veins. *Hab.* Sumatra.—*H. vintea* (Butler, Trans. Ent. Soc. Lond. 1879, pl. 69, f. 6); a broad-winged species. *Hab.* Malay Peninsula.—*H. Belia* (Westwood, Cab. Orient. Ent. pl. 37, f. 2), also a broad-winged species. *Hab.* Java.—*H. Hypermnestra* (Westwood, *l.c.* pl. 37, f. 1); a differently marked and broad-winged species. *Hab.* Borneo.—In the genus *Nectaria* there are the Indo-Malayan species *N. leuconoe* (Erichson) figured in Doubleday and Hewitson's *D. Lep.* pl. 13, fig. 2. *Hab.* Philippines, Borneo, and Singapore, and *N. Clara* (Butler, Trans. Ent. Soc. Lond. 1867, p. 469). *Hab.* N. Formosa.—Of the allied genus *Gamana*, there is *G. Daos* (Boisduval, Spéc. Gén. Léop. i. pl. 24, f. 3). *Hab.* Malay Peninsula, Pinang, Sumatra, Borneo; and *G. costalis* (Moore, P.Z.S. 1883, p. 221). *Hab.* Nias Island. And, in *Ideopsis*, are described *I. Gaura* (Horsfield, Lep. E. I. Comp. 1829, pl. 6, f. 1). *Hab.* Java.—*I. Glaphyra* (Semper, P.Z.S. 1883, p. 222). *Hab.* Mindanao; and *I. Anapis*, Felder, Nov. Voy. Lep. pl. 43, f. 6. *Hab.* Luzon.

Genus RADENA.

Radena, Moore, Lepidoptera of Ceylon, i. p. 3 (1880). Distant, Rhopal. Malayana, p. 9 (1882). Moore, Proc. Zool. Soc. Lond. 1883, p. 223.

Danaus (part), Latreille, Gen. Crust. et Ins. iv. p. 201 (1809).

Hestia (part), Hübner, Verz. bek. Schmett., p. 15 (1816).

Danaïs (*Radena*), Marshall and De Nicéville, Butt. of India, &c., I. p. 32 (1882).

IMAGO.—*Forewing* moderately long; triangular; first subcostal branch emitted at about one-third before end of the cell and anastomosed to the costal in the middle, second branch emitted immediately before end of the cell third and fourth branches at equal distances beyond; discocellulars concave, upper slightly bent before the middle, producing a very short discoidal spur within the cell from the angle, lower discocellular slender at its upper end; upper radial from end of the cell in a line with the subcostal, lower radial from the middle; median veins at equal distances apart; submedian with a slender short lower basal veinlet. *Hindwing* broad, somewhat triangular; costal margin long, nearly straight, abdominal margin long; costal vein very convex from the base and then extending straight along edge of the margin; cell long, broad; subcostal and median branches very wide apart. *No scent-pouch in male*. Antennæ longer than in allied genera, with a more gradually thickened and blunt club; apical joint of palpi long.

LARVA.—With two pairs of fleshy filaments.

Type.—*R. similis*.

RADENA VULGARIS (Plate 5, fig. 1, 1a, ♂ ♀).

Danaïs vulgaris, Butler, Entom. Monthly Mag. xi. p. 164 (1874). Moore, Proc. Zool. Soc. Lond. 1878, p. 822.

Radena vulgaris, Distant, Rhopal. Malayana, p. 10, pl. 1, fig. 8 (1882). Moore, Proc. Zool. Soc. London, 1888, p. 223.

Danaïs (*Radena*) *vulgaris*, Marshall and De Nicéville, Butt. of India, &c., I. p. 32, fig. ♂ (1882).

Euplœa similis, Zinken-Sommer, Nova Acta Acad. Cur. 1831, p. 175 (*nec* Linn.).

IMAGO.—Male and female. Black; markings bluish-white. *Forewing* with a lengthened streak from base of cell, followed by an irregular indented mark beyond; a costal streak followed by three narrow spots, a discal series of narrow, elongated spots, a subapical series, a submarginal row of rather large spots, and a marginal row of minute spots, two lengthened streaks below the cell, and a short streak at lower base of the wing. *Hindwing* with long narrow streaks within the cell, a discal series of long and narrow streaks, a submarginal row of narrow spots, and a marginal row of minute spots. Thorax and head, white spotted; palpi and legs with white streaks, abdomen above brown, paler beneath.

Expanse, 3 to 3½ inches.

HABITAT.—Burma; Mergui.

DISTRIBUTION.—Within our limits *R. vulgaris* has not been recorded west of

Burma. Mr. De Nicéville (*l.c.* p. 33) gives the following: "Mr. Ossian Limborg collected it at Ahsown, Moulmein, to Meetan, and the Houngduran source in Upper Tenasserim; Mr. A. Allen took it at Bassein; Capt. C. H. E. Adamson in the neighbourhood of Moulmein in March, June, October, and December; Captain Bingham took it in the Thoungyeen forests in May. It is common at Rangoon. Dr. J. Anderson has taken it at Mergui in December."

GEOGRAPHICAL DISTRIBUTION.—Southward it extends through the Malay Peninsula, occurring also in the Island of Penang and Singapore, to Sumatra and Java, and also to South Borneo.

TOPOGRAPHIC ALLIES.—A closely allied species (*R. persimilis*, Moore, P.Z.S. 1879, p. 136) has been collected at Chentaburree in Siam, and the typical species of the genus (*R. similis*, Linn. Clerck Icones, pl. 16, f. 3), is a native of South China, Hongkong, and Formosa.

RADENA NICOBARICA (Plate 5, fig. 2, 2a, ♂ ♀).

Danaïs similis, var., *Nicobarica*, Wood-Mason and De Nicéville, Journ. Asiatic Soc. Bengal, 1881, p. 225, fig. ♀; *id.* 1882, p. 14, fig. ♂ ♀.

Danaïs (Radena) Nicobarica, Marshall and De Nicéville, Butt. of India, &c., I. p. 34, fig. ♀ (1882).

IMAGO.—Male and female. Near to *R. exprompta*, but with the bluish markings less sharply defined. Forewing with the basal cell streak broader, the mark beyond larger and more quadrate, the discal and submarginal spots larger, the streaks below the cell somewhat shorter and conjoined at either end, there being in the male only a slender dividing black line extending partly along the middle, this line being broader in the female. On the hindwing, both sexes have the cell area traversed by an extremely slender fork-line, but which is scarcely seen in the male; the discal streaks are much more slender and shorter, leaving a conspicuous space between them and the submarginal spots.

Expanse, 3 inches.

HABITAT.—Great Nicobar.

In the original description of this species, Mr. Wood-Mason refers to the "submedian vein of the male as having the wing membrane on each side of it raised into a slight fold; the male of this species, in fact, being provided with a distinct, though little specialized, sexual mark or scent gland."

RADENA EXPROMPTA (Plate 5, fig. 3, 3a, ♂ ♀).

Danaïs exprompta, Butler, Entom. Monthly Mag. xi. p. 164 (1874).

Radena exprompta, Moore, Lep. of Ceylon, i. p. 4, pl. 2, fig. 1 (1880); *id.* Proc. Zool. Soc. Lond. 1883, p. 224.

Danaïs (Radena) exprompta, Marshall and De Nicéville, Butt. of India, &c., I. p. 33 (1882).

IMAGO.—Male and female. Upperside black, abdominal margin pale brown. Forewing with a pale bluish-white narrow basal streak and a large sinuous quadrate

spot beyond it within the cell, a slender costal streak from the base. Two streaks below the cell and a slender basal streak on the hindmargin, two large discal spots, three small upper spots, and five subapical spots, the upper three of which are slender, a submarginal regular series of seven small spots, and a marginal row of minute spots. *Hindwing* with pale bluish-white broad basal streaks, large discal spots, an irregular submarginal and a marginal row of small spots. *No scent-pouch in male*. Head, thorax, and palpi white spotted, femora beneath streaked with white; abdomen brown above, paler beneath. Underside: forewing dark brown; hindwing umber-brown; markings as above, but paler.

Expanse, $2\frac{3}{4}$ to 3 inches.

HABITAT.—Ceylon.

DISTRIBUTION.—This butterfly, writes Captain Wade-Dalton, "is common in the Kottawa forest. Not seen elsewhere." Mr. F. M. Mackwood states it to be "a low country butterfly."

INDO-MALAYAN ALLIED RADENAS.—These topomorphic species are *R. Juventa* (Cramer, Pap. Exot. ii. pl. 188, f. B.), inhabiting Singapore, Java, Sumatra, Billiton, Lombok, Labuan; *R. Manillana* (Moore, P.Z.S. 1883, p. 222), *Hab.* Manilla, and *R. Luzonica* (Moore, *l.c.* p. 222), *Hab.* Luzon.

Genus TIRUMALA.

Tirumala, Moore, Lepidoptera of Ceylon, i. p. 4 (1880), *id.* Proc. Zool. Soc. Lond. 1883, p. 230.

Danaïs (part), Godart, Encycl. Méth. ix. pp. 10, 172 (1819).

Danaïs (*Tirumala*), Marshall and De Nicéville, Butterflies of India, &c., i. p. 45 (1882).

Danaïs (section B, part), Distant, Rhopalocera Malayana, p. 16 (1882).

IMAGO.—*Forewing* broad, triangular; first branch of the subcostal vein emitted at one-fifth before end of the cell and free from the costal vein; second branch from end of the cell; discocellulars bent acutely inward in the middle below upper radial, and emitting a short point within the cell from the angle; lower discocellular slender near its upper end; submedian with a short lower basal veinlet. *Hindwing* broadly oval, exterior margin very convex; costal vein slightly curved; cell short, and anteriorly oblique; second subcostal branch emitted nearer the first, and upper median nearer the middle branch than in *Radena*. *Male with an open scent-pouch* situated between the lower median and submedian veins, the pendant sac of which is prominent on the underside of the wing (the interior of the pouch containing, in the dried specimen, numerous minute white filaments). Antennæ shorter than in *Radena*, the club also shorter and the tip more pointed. Apical joint of the palpi shorter.

LARVA, with two pair of fleshy filaments.

TYPE.—*T. Limniace*.

TIRUMALA LIMNIAE (Plate 6, fig. 1, larva and pupa, 1a, b, ♂ ♀).

Papilio Limniace, Cramer, Pap. Exot. i. pl. 59, fig. D E (1775), ♀. Herbst, Nat. Ins. vi. pl. 123, fig. 3, 4 (1793).

Danaïs Limniace, Godart, Encycl. Méth. ix. p. 191 (1819). Semper, Mus. Godeffroy, xiv. Lep. p. 139, pl. 8, fig. 6, ♂ (1879). Staudinger, Exot. Schmett. p. 49, pl. 24, ♂ (1885).

Tirumala Limniace, Moore, Lepidoptera of Ceylon, i. p. 4, pl. 1, fig. 3 (1880), *id.* Proc. Zool. Soc. Lond. 1883, p. 230. Hampson, Journ. Asiat. Soc. Beng. 1888, p. 347.

Danaïs (Tirumala) Limniace, Marshall and De Nicéville, Butt. of India, i. p. 47 (1882).

Papilio Exoticus, Gmelin, Syst. Nat. i. 5, p. 2289 (1788-93). Zschach, Mus. Leskeanum, Ent. p. 89 (1788).

Papilio similis (part), Fabricius, Ent. Syst. iii. p. 58 (1793).

Danaïs leopardus, Butler, Proc. Zool. Soc. 1866, p. 52.

Petiver, Gazophyl. i. pl. 92, fig. 13.

IMAGO.—Male and female. Upperside blue-black, with large and broad diaphanous bluish-white markings. *Forewing* with a discoidal claviform streak and large constricted spot beyond, a lengthened spot and a lower streak beneath the cell—the two latter in some specimens are coalesced and thus form a hatchet-shaped mark, in others either both or only one joins the lower discal spot; three discal spots (the lower sometimes joined to the contiguous streak), above which are three or five narrow subapical spots obliquely from the costa; a submarginal irregular series of small spots, and a marginal row of smaller spots. *Hindwing* with the bluish-white cell mark traversed by a single or forked slender streak; an upper discal series of spots, the two lower being elongated, a lower discal series of slender lengthened streaks, an irregular submarginal and a marginal series of small spots. *Male with a prominent scent-pouch* situated between the lower median and submedian veins. Head, thorax, and palpi white spotted, a dorsal streak on thorax and femora beneath, white; abdomen brown above, ochreous and white beneath. Under-side golden-brown, in some greenish-brown, the basal area of forewing being black; markings as above; the protruding pouch of male black edged.

Expanse, $2\frac{3}{4}$ to $3\frac{3}{4}$ inches.

LARVA.—Yellowish-white or yellowish-green, with a pair of long fleshy filaments on the third segment and a short pair on the twelfth segment, the filaments black and greenish-white, longitudinally lined with black points; each segment marked with transverse black bars, one on each thicker and bifurcating near the lateral line, a narrower bar at anterior edge, and two narrower bars also at posterior part of the segment; lateral band yellow; head and feet ringed with black.

PUPA.—Suspended by the tail. Somewhat cylindrical, constricted below the thorax; green, with golden scattered dots and beaded dorsal crescent.

HABITAT.—India, Ceylon, Burma, Nicobars.

FOOD PLANTS OF LARVA.—Feeds on *Asclepias*; *Calotropis*; and *Hoya*.

LIFE HISTORY.—The following notes on the rearing of this insect are given by Dr. R. W. Forsayeth (Trans. Ent. Soc. 1884, p. 381):—"Mhow, Sept. 12, 1881.—Found the larvæ on a creeper or vine with stout woody stem and greenish-yellow bark, leaves broad, smooth, and pointed at extremity. This vine grew close to a tree in my garden and clung to its branches. All the specimens I bred were obtained from this one plant. The larva is a pale yellowish-green, ribbed with black transverse lines; black markings also on the head; it has four smooth black fleshy horns, two anteriorly and two posteriorly. The larvæ possess no irritating powers; they curl up and simulate death for some moments when handled. A fine web attaches them by the prolegs to the leaf on which they are at the time feeding. The pupæ are attached by the tail only; colour at first green, but in a day or two numerous patches of gold of most brilliant lustre appear on the body and head; and a crescentic line of dots. The perfect insects appeared from Sept. 26th to Oct. 20th, from two different broods of larvæ found on the same plant. Of these two were females and five males. The pouch of the male opens from the upper side of the wing, and contains a fine granular powder like plumbago, quite inodorous. The males also possess a dense tuft of long yellow hairs like a brush at each side of last segment of abdomen, but underneath the cuticle; I never saw them protruded, and am unacquainted with their use."

GEOGRAPHICAL DISTRIBUTION.—This species has a very wide range, being found in the driest as well as the dampest localities. In the extreme North-west of our limits it has been taken by the late Dr. Bayne Reed in Kashmir; by Major J. W. Yerbury (Ann. Nat. Hist. 1888, 132) at Khairabad in July; at Allahabad and Rawul Pindi by Capt. H. B. Hellard; in the Kangra District by Rev. J. H. Hocking; and in Kulu, according to Mr. A. G. Young, it is common in some years, rare in others, occurring in May, August, and October; in the Simla district by Colonel A. M. Lang (Ann. Nat. Hist. 1864, 131); Mr. W. Doherty (J.A.S. Beng. 1886, 113) took it at Ranibagh at the foot of the Kumaon Hills. North-eastward, Major-Genl. G. Ramsay obtained it in Nepal, and in Sikkim it is stated by Mr. De Nicéville (J.A.S. Beng. 1883, 92) to have been taken by the late Mr. Otto Müller, who met with some few specimens in the Terai and Runjit Valley. It is found throughout the plains of N. India, being on the wing nearly all the year round, extending Westward into Sind, and by Col. C. Swinhoe (P.Z.S. 1884, 504) was "taken at Karachi, plentifully, in July of 1882, after the unusually heavy rains of the summer of that year, though not usually found there or along the coast, as not a single specimen was taken during the whole of 1879 or 1880; subsequently, however, it has become quite a common insect during the months of July and August, since the introduction of the Mulceer Water-works into Karachi, and the consequent increase of vegetation.

It is also common in the interior of Sind." At Mhow (P.Z.S. 1886, 421) it is "very common from September to July," and in the Dekkan, and Bombay, it is "common all the year round" (P.Z.S. 1885, p. 125). Mr. E. H. Aitken also states (Journ. Bombay, N.H. Soc. 1886, 128) that it is "common in Bombay, especially on the Hills. The larva found at Lanowlie in October, feeding on *Hoya viridiflora*. The offensive smell which makes reptiles and birds reject this family of butterflies is particularly strong in this species, and is certainly connected with the extrusion of the yellow plumes. It is also a very difficult insect to kill; pinching the thorax has a temporary effect, but it soon revives; even when killed past reviving and pinned, it will continue to wag its head and antennæ satirically for some days."

Proceeding Southward, we have it from Malabar (S. N. Ward), the Nilgiris (G. F. Hampson), and in Travancore Mr. H. Fergusson states (Butt. Ind. i. p. 47) it is common from the foot of the Hills to the sunmits, most abundant in November and December, common throughout February, only a few seen in March, but again fairly common in the higher elevations in April and May. In Madras Sir W. Elliot (MS. Notes, No. 25) found the "larvæ [plate 6, fig. 1] in December, 1850, feeding on *Hoya viridiflora*, changing to pupa on the 19th and to the imago on the 29th of that month." In Lower Bengal Mr. W. C. Taylor notes it as common at Khorda in Orissa; and the late Mr. R. Frith found the larva feeding on *Calotropis volubilis*. Mr. De Nicéville (Butt. of Ind. i. p. 47) states that in Calcutta it is plentiful all through the year, and to be met with everywhere, particularly in gardens, where it is almost the commonest insect seen. Like the rest of the genus, it has a slow flapping flight, and settles frequently, often at the very end of a dead stick." At Barrackpur, Mr. J. Rothney also found it very common from March to October. North-eastward, Mr. J. Wood-Mason (J.A.S. Beng. 1886, 344) found it "common in Cachar in April, May and June." Mr. S. E. Peal has taken it at Sibsagar in Upper Assam, and Mr. J. L. Sherwill recently took it in the Naga Hills.

In Burma it is not uncommon at Rangoon and Toungu. Dr. J. Anderson (J. Linn. Soc. Lond. Zool. xxi. 1886, 29) obtained it at Tavoy in December, and at Mergui in March. Further inland, on the Irrawadi River opposite Mandalay, Commander A. Carpenter, R.N., obtained it on the 10th of January (Ann. N.H. 1886, 182).

On the island of Ceylon, Capt. Hutchison (Lep. Ceylon, i. 5) obtained it "at Colombo in open or partially cultivated ground, being most common from October to December, having a heavy slow flight, and often found in crowds on low shrubs in company with *T. septentrionis*." In the Nicobars, it was obtained, commonly, by the late Mr. F. A. De Roëpstorff on Nankawri, Kamorta, and Kar Nicobar Isles, and on the same islands more recently by Mr. W. Doherty, as well as on the Teressa and Bompoka Islands.

Beyond our limits, this species is recorded from Cambodia, Foochow, S. China, Hong-Kong, Formosa, and Hainan.

PARASITES OF *T. LIMNIACE*.—Mr. S. N. Ward, in his Malabar Entom. MS. notes, writes, "Several chrysalids of *E. Limniace* which were brought to me the other day adhering to the rough leaf with which the carpenters here polish their finer work, have produced little parasites with yellow legs, the thighs of the hinder pair very long, curved, and shiny, shaped something like the foreleg of the Mantis, the thorax raised and scaly. They are continually turning their long hindlegs over their back and sometimes down the back of the thorax and wings. The spot-underwing (balancer) yellow. The same insect attacks the chrysalis of *Pieris Epicharis*. Another kind of parasite is a red-headed fly, in shape something like the house-fly, but larger, I have found in the larvæ of different kinds of Euplœa."

TIRUMALA GAUTAMOIDES (Plate 6, fig. 2, 2a, ♂ ♀).

Danaïs (Tirumala) Gautamoides, Doherty, Journ. Asiat. Soc. Beng. 1886, p. 257.

IMAGO.—Male and female. Smaller in size and of blacker colour than *T. Gautama*; the semihyaline markings broader and shorter, and of a bluish-white tint. On the forewing the discoidal streak from the base of the cell is bifid, as in *T. Gautama*, but the upper branch is the shortest and is remote from the mark at the end of the cell, the latter mark being shaped somewhat as in *T. septentrionis*, but less oblique, and in the male the latter is joined to the lower branch. On the hindwing the cell mark is usually cleft into three parts by slender black lines. Underside also blacker than *T. Gautama*, the colour being of a uniform tint throughout both wings.

Expanse, $2\frac{3}{4}$ to 3 inches.

HABITAT.—Southern Nicobars.

DISTRIBUTION.—For the discovery of this butterfly we are indebted to Mr. W. Doherty, who states (Journ. Asiat. Soc. Beng. 1886, 257) that "it is apparently an insular representative of *T. Gautama*; somewhat transitional to *T. Limniace*. It is common in the Southern Nicobars, on the Great and Little Nicobar, and Kondul. It seems to be mimicked by *Radena nicobarica*, which I have often taken in company with it."

TIRUMALA GAUTAMA (Plate 7, fig. 1, 1a, ♂ ♀).

Danaïs Gautama, Moore, Annals and Mag. Nat. Hist. 1877, p. 43.

Tirumala Gautama, Moore, Proc. Zool. Soc. Lond. 1883, p. 231, pl. 31, fig. 3.

Danaïs (Tirumala) Gautama, Marshall and De Nicéville, Butt. of India, &c., i. p. 45 (1882). Adamson, Proc. Asiat. Soc. Bengal, 1882, p. 142.

IMAGO.—Brownish-black, with bluish-white markings. Forewing with two long streaks from base of the cell, and three short streaks at its end, the upper one of the latter being broken and partly joined to the upper basal streak; a series of five narrow subapical streaks beyond end of the cell, seven discal spots, two lengthened

narrow streaks below the cell, the upper streak of a curved-club shape, the lower streak generally joined to the lowest discal spot; five small spots curving before the apex, sometimes three only in the female; a marginal row of spots, and a short streak at base below the submedian vein. *Hindwing* with three streaks within the cell, a discal series of elongated streaks, and two outer rows of small spots. Under-side paler than above, the dark colour of the hindwing tinged with green.

Expanse, $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—Burma.

Distinguished from *T. Limniace* and *T. septentrionis* in having two basal streaks within the cell of the forewing, wider interspaces between the discal and marginal series of spots, and in the form of the streaks below the cell; on the hindwing there are three streaks within the cell.

DISTRIBUTION.—Has been obtained in Chittagong, and in Arakan in March and July. Capt. C. H. E. Adamson (Proc. A. S. Beng. 1882, 142) records it as “taken at one locality on the seashore at Akyab, where they were in company with *S. Genutia*, *S. hegesippus*, *L. chrysippus*, and *T. septentrionis*, which were all abundant at that one spot. Had I not been looking for them, I should have passed them over as *T. septentrionis*, but now I can tell the difference at once on the wing. *T. gautama* shows much less blue when on the wing, and is more like *P. Aglea* in appearance, except for its larger size.” It was also captured in Moulmein in June (Butt. Ind. i. 46). Mr. Watkins also received it from Henzada in the Moulmein District. Capt. C. T. Bingham took a single specimen in the Meplay Valley; and Dr. J. Anderson (J. Linn. Soc. Zool. xxi. 29) obtained it commonly in “Mergui in December and March, and also at Zediwon in December.”

INDO-MALAYAN ALLIED TIRUMALAS.—These topomorphic species are *T. Melissa* (Cramer, Pap. Exot. iv. pl. 377, figs. C D), and *T. conjuncta* (Moore, P. Z. S. 1883, p. 231), both of which are inhabitants of Java;—*T. microsticta* (Butler, Ent. Monthly Mag. 1874, p. 163), described from Borneo, occurring also in Java and Nias;—*T. orientalis* (Semper, Mus. Godeffroy, xiv. pl. 8, f. 5). Hab. Luzon.

TIRUMALA SEPTENTRIONIS (Plate 7, fig. 2, 2a, ♂ ♀).

Danaïs septentrionis, Butler, Entomologists' Monthly Magazine, xi. p. 163 (1874); *id.* Trans. Linn.

Soc. Zool. 1877, p. 536. Semper, Mus. Godeffroy, xiv. Lep. p. 140, pl. 8, fig. 7, ♂ (1879).

Distant, Rhopalocera Malayana, p. 16, pl. 1, fig. 9 (1882), ♂.

Tirumala septentrionis, Moore, Lepidoptera of Ceylon, i. p. 5, pl. 1, fig. 2 (1880); *id.* Proc. Zool.

Soc. Lond. 1883, p. 231, pl. 29, fig. 3, ♂. Hampson, Journ. Asiat. Soc. Beng. 1888, p. 347.

Danaïs (Tirumala) septentrionis, Marshall and De Nicéville, Butt. of India, &c. i. p. 48, pl. 6, fig. 8, ♂ ♀ (1882).

IMAGO.—Male and female. Upperside blue-black; both wings with semidia-phanous markings of similar shape and positions to those in *T. Limniace*, but of a

deeper blue tint. It differs from *T. Limniace* in the longitudinal streaks being narrower and the transverse series of spots smaller, and, consequently, leaving much broader interspaces. On the forewing the basal streak within the cell and that from the base beneath it are slender, in some specimens almost linear, the lower streak being shorter and not extending to half the length of the lower inner discal spot, which latter is also always shorter, and from which, as well as from the outer discal spot beyond, it is always widely separated (whereas in *T. Limniace*, the lower basal streak always extends to the length of the inner lower discal spot, and with which and also with the spot beyond, it sometimes coalesces); the indented spot at end of the cell is sometimes divided at its narrowest upper end. On the hindwing, the streaks within the cell are slender and widely divergent, and have sometimes a minute dentate spot between them at the end of the cell. Underside golden-brown, the basal area of forewing violet black.

Male with a similar prominent scent-pouch situated as in *T. Limniace*.

Expanse, 2 $\frac{3}{4}$ to 4 inches.

LARVA.—Unknown.

HABITAT.—India; Ceylon; Burma.

GEOGRAPHICAL DISTRIBUTION.—This butterfly is less generally distributed than *T. Limniace*. It has not been obtained in the Nicobars or Andaman Islands. In the N.-W. Himalayas, it occurs in the Kangra District (Rev. J. H. Hocking). In Kulu, according to Mr. A. G. Young, "it very seldom occurs, generally in July." "In Chumba, at 3000 feet elevation," it is stated that "there is a spring brood in April, and in the Simla District, Mr. De Nicéville has taken it rather sparingly from August to October, and only in beds of streams with richly-wooded sides; in one such locality near Kotgarh, elevation about 6000 feet, it was fairly plentiful in August, 1879." (Butt. Ind. i. 48.) It was noted in Major-Gen. Ramsay's collection from Nepal. In Sikkim, Mr. J. H. Elwes states (Ent. Soc. Lond. 1888, 330) that it is "commoner there than *T. Limniace*, and occurs up to about 5000 feet from April to December." In the Runjit Valley, 1200 to 3000 feet, it has been taken in November. Of its occurrence between the Himalayas on the North and the South of the peninsula there is as yet no record. In the extreme South it has been taken in Malabar by Mr. S. N. Ward, in the Wynaad by Dr. Bayne Reed, and on the Nilgiris by Mr. G. F. Hampson. In Lower Bengal, it is noted in Mr. W. C. Taylor's "List of Orissa Butterflies," as being rare at Khorda. North-eastward, in Cachar, Mr. Wood-Mason (J. A. S. Beng. 1886, 355) states that it is "common, specimens also taken on Nemotha Peak at 3300 feet elevation." It is also noted in Mr. J. L. Sherwill's List, as occurring in the Naga Hills, Assam.

In Burma, Mr. Limborg (P. Z. S. 1878, 822) took it on and around the Moulayet Hills in Upper Tenasserim, at Ahsown, Meetan at 3000 feet, and at

Hatseiga, and Mr. Wood-Mason (J. A. S. Beng. 1887, 414) notes that "numerous specimens were obtained at Tavoy, Pongseik, and on the hills on the Siam frontier."

Dr. J. Anderson (Journ. Linn. Soc. Zool. xxi. 1886, 29) collected it at Mergui in December, and at Thaïng, King Island, in February." In Ceylon, Capt. Hutchison "took it at Colombo, and occasionally near Newera Eliya, in open or partially cultivated ground. Most common from October to December. Often being found in crowds on low shrubs, in company with *T. Limniace*." Mr. F. M. Mackwood writes that it is "a low country butterfly; about all the year round, but very abundant in the coconut groves near the sea-coast about December and January. A few of them in the monsoon flights in November to December."

Genus LIMNAS.

Limnas,* Hübner, Tentamen, i. p. 1 (1806); *id.* Samml. Exot. Schmett. Bd. 1, pl. 22, f. 1, 4 (1806).

Scudder, Proc. American Acad. Arts & Sci. (1875), p. 207. Moore, Proc. Zool. Soc. Lond. 1883, p. 237.

Danais (part), Godart, Encycl. Méth. ix. pp. 10, 172 (1819).

Danais (*Salatura*, Sect. B. part), Marshall and De Nicéville, Butt. of India, &c., I. p. 49 (1882).

Danais (Section B. part), Distant Rhopalocera Malayana, p. 16 (1882).

IMAGO.—*Forewing* narrower, and of a comparatively more lengthened triangular form than in typical *Salatura* (*S. Genutia*); costa less arched, and the apex more produced; exterior margin less uneven. *Hindwing* regularly convex exteriorly, and the margin more even; costal vein abruptly arched; cell shorter at its upper end; discocellulars bent inward near the middle, emitting a short discoidal spur or veinlet within the cell from the angle; lower discocellular slender at its upper end; lower radial emitted from middle of discocellulars opposite the inner spur. *Male* with a scent-pouch similar to that in *Salatura*. *Antennæ* stouter, with a well-formed thick club.

LARVA.—With three pairs of fleshy filaments.

Type.—*L. Chrysippus*.

LIMNAS CHRYSIPPUS (Plate 8, fig. 1, larva, 1 a, b, c, d, e, ♂ ♀).

Papilio Chrysippus, Linnæus, Syst. Nat. (1758), p. 471; Mus. Ulr. p. 263 (1764); Syst. Nat. i. 2, p. 767 (1767). Cramer, Pap. Exot. ii. pl. 118, fig. B C (1777). Fabricius, Ent. Syst. iii. 1, p. 50 (1793). Herbst, Nat. Schmett. vii. p. 13, pl. 155, fig. 1, 2 (1794). Hübner, Samml. Eur. Schmett, i. pl. 133, fig. 678-9.

Limnas ferr. Chrysippus, Hübner, Samml. Exot. Schmett. Bd. i. pl. 22, fig. 1—4 (1806).

Limnas chrysippus, Hübner, Tentamen, i. p. 1 (1806). Moore, Proc. Zool. Soc. Lond. 1883, p. 237.

Butler, Proc. Zool. Soc. Lond. 1884, p. 479; 1886, p. 356. Butler, Proc. Zool. Soc. 1886, p. 356.

Hampson, Journ. Asiat. Soc. Beng. 1888, p. 347.

Euplaea chrysippus, Hübner, Verz. bek. Schmett. p. 15 (1816). Ochseneheimer, Schmett. Eur. iv.

* Hübner having used this name for *L. Chrysippus*, and other species of this sub-family, in his "Samml. Exot. Schmett." thus fixed its type and its restriction to this group of butterflies.

- p. 120, pl. 4, f. 11, 12 (1816). Zinken-Sommer, *Nova Acta Akad. Nat. Cur.* xv. p. 173 (1831).
- Danaïs chrysippus*, Godart, *Enc. Méth.* ix. p. 187 (1819); *id.* Lep. France, p. 106, pl. 27, fig. 1, 2. Latreille, *Dict. d'Hist. Nat.* 2nd Ed. p. 118, pl. 9. Trimen, *Rhop. Afr. Austr.* p. 88 (1862). Butler, *Catal. Fabr. Lep. B. M.* p. 5 (1869). Distant, *Rhop. Malayana*, p. 20, pl. 1, fig. 10 (1882).
- Salatura chrysippus*, Moore, *Lepidoptera of Ceylon*, i. p. 7, pl. 3, fig. 1 (1880).
- Danaïda chrysippus*, Aurivillius, *Konigl. Vet. Akad. Handl.* 1882, p. 70.
- Danaïs (Salatura) chrysippus*, Marshall and De Nicéville, *Butt. of India, &c.*, I. p. 50, pl. 6, fig. 10, ♂ ♀ (1882).
- Anosia Chrysippus*, Semper, *Reisen Archipel. Philippen*, Lep. p. 16, pl. A. f. 2, 2a, *larva & pupa*.
- Papilio Ægyptius*, Schreber, *Nov. Spec. Ins.* p. 9, fig. 11, 12 (1759).
- Papilio asclepiadis*, Gagliardi, *Atti Instit. Napol. i.* p. 155, pl. 1 (1811).

IMAGO.—Male and female. Upperside: *forewing* with the costal margin and apical area curving to posterior angle brownish-black; the basal area including the veins bright ferruginous, darkest anteriorly; two very small white spots on middle of the costa, one—and sometimes two—immediately beyond end of the cell, one above the disc, two on middle of the submargin, an incomplete marginal row of dots, two or three before the apex, and an oblique subapical series of larger spots. *Hindwing* bright ferruginous, with a narrow sinuous marginal black band containing a row of white dots, which are obsolescent anteriorly; the small black spots at end of the cell, and *in the male*, a black quadrate spot encompassing a scent-pouch situated close to the lower median vein between it and the submedian. *Cilia* alternated with white. *Head*, thorax, antennæ, legs and palpi, black, spotted with white; thorax above and femora beneath white streaked; abdomen ferruginous above, white beneath.

Underside of the wings, as above, the ferruginous colour being paler and brighter, the white spots more prominent, those at end of the cell and the marginal band on the hindwing, white bordered, and the pouch of the male white centred.

Expanse, $2\frac{1}{4}$ to 3 inches.

“EGG.—Sugar-loaf shaped; cream colour. Deposited singly on under surface of the leaf.

“YOUNG CATERPILLAR.—When hatched the tentacula are barely visible. *After first moult*, $\frac{1}{4}$ inch long; ground colour bluish-lilac; dorsal line faint; sides bright yellow; abdomen greenish, ventral line darkish green; prolegs greenish-yellow or brown, streaked with black, thoracic legs the same; anal segment with a broad black dash and a large square patch below it. Head the same colour as body, with two semicircular black bands, one within the other; spiracles black. On each segment are five narrow bands of black, and between the second and third band is a broad yellow dash, divided by the dorsal line; at the exterior margin of these spots, on

the third, sixth, and twelfth segment, is a pair of short black fleshy tentacula, one on each side, those on the front segment longest.

“ADULT CATERPILLAR.—Length, $1\frac{1}{4}$ inch. Body cylindrical, ground colour and general description same as after first moult, with the exception that the tentacula are long and movable, *ad libitum*, by the caterpillar. Each of these tentacula spring from an elevated crimson base.

“CHRYSLIS.—Suspended by the tail; clear cream colour or semi-transparent green; short and thick; somewhat cylindrical, much swollen at the base; tail black; a transverse ridge of yellow bordered by black, and iridescent, extending in a semi-circle only across the back, some golden spots round the head.” (*Capt. H. L. de la Chaumette, MS. Notes.*)

HABITAT.—Throughout India; Burma; Nicobars; Ceylon.

HETEROPECILIC ABERRATION.—The butterfly represented on our Plate 8, figure 1 *e*, is a variety of the female of this species, in which the ground colour is very bright, the white subapical oblique markings being elongated and partly confluent. It was taken by Col. C. Swinhoe at Poona, in September.

DICHOIC CHRYSLIDES.—The chrysalides of *L. chrysippus* are of two colours, some being bright green, and others pale pinkish wax-white. Mr. Wood-Mason (*Butt. Ind. i. 51*) “has ascertained that this difference in colour is not sexual, males and females being produced indifferently from green and pink chrysalides, and he considers that we here have to do with an instance of the same animal at the same stage of its development being protected by its resemblance to two different parts of the plant on which it feeds and resides, namely, the leaves and the blossoms, the green chrysalides matching green leaves, and the pink ones being of a colour likely to be mistaken by birds, reptiles, and predaceous insects for a blossom.”

FOOD PLANTS AND HABITS OF LARVA.—The larva of *L. chrysippus* feed on the leaves and flowers of the ‘Madar’ (*Calotropis gigantea*) and on the Swallow Wort (*Asclepia curassavica*). It is generally solitary; sometimes two or three are found together.

DISTRIBUTION WITHIN INDIAN AREA.—This is reckoned to be the commonest and most widely spread of all the Indian butterflies. No locality seems to be unsuited to it. Up to a level of 7000 feet it may be found anywhere in the Indian Empire, but perhaps the dry, hot plains of Northern India are on the whole the most congenial to it, for it is there that it is most conspicuous, as it is almost the one solitary species that can thrive in the dust and glare. It seems, moreover, to be as indifferent to season as it is to locality, and in the Plains of North India it is to be found throughout the year, though most abundant in the winter months. Only in the Hills does its appearance seem to be governed by season. It has, however, not been recorded

from the Andaman Isles, though it occurs at the Nicobars (Butt. of India, i. 50). In the North-west Himalayas, Dr. Bayne Reed and Capt. Hellard both obtained it in Kashmir, the latter also at Rawul Pindi and Allahabad (P. Z. S. 1886, 356). Major Yerbury took it at Campbellpore (1200 ft.) in June and July, and at Marri, August. Common also at Abbotabad. Mr. A. G. Young, writing from Kulu, says, "the first brood appears in June, then a succession of broods from August throughout the autumn. I found a great number of the larvæ whilst marching through the Sialkot District in May; they were on that species of Euphorbium so common on sandy ground in the Punjab" (Butt. Ind. i. 50). Obtained by Rev. J. H. Hocking at Jullundur in the plains (P. Z. S. 1882, 234). In Kumaon, Mr. W. Doherty (J. A. S. Beng. 1886, 113) took it "at Ranibagh, Kali Valley to Dharchula (3000 feet), but it was not common." In the Simla District by Col. A. M. Lang, and by Mr. De Nicéville, who "only met with it in the autumn." At Lucknow, Capt. Chaumette notes it as being "abundant all the year, frequenting every part of the District. Obtaining the larva in September." North-eastward in Sikkim, Mr. J. H. Elwes (Tr. Ent. Soc. 1888, 300) records it as "not so common as in dryer districts, but occurs up to about 3000 feet in most months of the year." Mr. De Nicéville (J. A. S. Beng. 1881, 49) found it "common in the open between Siligori and the Terai forest belt." Westward, in Sind, Col. C. Swinhoe says (P. Z. S. 1884, 504) it is "common all the year round. In Karachi (P. Z. S. 1885, 337) I have taken examples of it in every month, the specimens captured during the winter months being of a much smaller size than those taken in the warmer months." Capt. Lloyd obtained it in Kattywar. In Mhow, "common from September to March" (P. Z. S. 1886, 421). Mr. E. H. Aitken (J. A. S. Beng. 1886, 127) says that "with the exception, perhaps, of *Terias Hecabe*, this is the commonest and most ubiquitous butterfly on the Bombay side of India. At Kharaghora, on the edge of the Runn of Kutch, this was one of the few insects I could get, and my chameleon would starve rather than eat it. Dwarf specimens are not uncommon. I found the larva only on *Calotropis*." Southward, Mr. G. F. Hampson records it (J. A. S. Beng. 1888, 347) from the Nilgiris. Dr. Leith, who frequently reared this insect in Bombay, says in his "Notes," that "the larva commences feeding, on the leaf of the *Calotropis*, indifferently at the edges or the middle." Northward, at Balasore, Lower Bengal, Mr. A. Grote notes that he "found the larva in August on the *Dudh lata* (*Asclepiad*), and in the neighbourhood of Calcutta Mr. De Nicéville says (J. A. S. Beng. 1885, 40) "it is the commonest butterfly to be met with." It is recorded from Cachar by Mr. Wood-Mason (J. A. S. Beng. 1887, 345), and from the Naga Hills, in Mr. J. L. Sherwill's List. In Burma, it was obtained by Mr. O. Limborg (P. Z. S. 1878, 822); in Upper Tenasserim at Ahsown, and by the Indian Museum Collector at Tavoy (J. A. S. Beng. 1886, 415). Also recorded (Ann. N. H. 1886, 182) from "above Mandalay." Dr. J. Anderson

(J. Linn. Soc. xxi. 30) took it in "Mergui in December and March." In the Nicobars it has been taken on the Island of Katschall (J. A. S. Beng. 1882, 15). In Ceylon, Mr. M. F. Mackwood writes that it is "found all over the island, but principally in low country. A few joining in the November and December flights. Larva found on *Calotropis*."

GEOGRAPHICAL DISTRIBUTION OUTSIDE INDIAN AREA.—Bordering our immediate North-western limits, we have note of its capture by Col. C. Swinhoe in Southern Afghanistan (P. Z. S. 1885, 337), who obtained specimens "at Koondalane in March, at Mach in August, at Chaman in May, at Quetta in September, and at Kandahar in October. It was nowhere common, but one or two were to be seen occasionally wherever we stayed, throughout the year, when the weather was not too cold. Specimens taken in the winter months being of a much smaller size than those taken in the warmer months." Westward, it extends through Persia and Asiatic Turkey to South-eastern Europe; occurring also in Eastern Africa, at Aden and Socotra, Southern and South-western Africa, the Islands of Madagascar, Comoroo, Johanna, Mauritius, and Rodriguez. Eastward of our limits—in Siam, Malay Peninsula, Penang, Singapore, Sumatra, Nias—(a variety, in which the forewing has the white of the subapical band extending through the cell towards the base, and, on the hindwing has white discal dashes, from Nias, being described by Weymer (Stett. Ent. Zeit. 1885, 258) as *L. clarippus*). In the paper on Major Yerbery's Aden Collection, Mr. Butler remarks (P. Z. S. 1884, 478) that at Aden "we find *L. chrysippus* gradually passing into *L. alcippus* and freely intermarrying with the Indo-African and Lower-Nubian types of *L. dorippus*; yet as the range of these forms does not by any means correspond, they are practically distinct." Even in Africa, where *L. chrysippus* has a wide range, it does not appear to co-exist with *L. alcippus*: it is true that the range of the latter species can be but imperfectly traced; thus in the British Museum series we only have it from Sierra Leone to Ashanti, and in Mr. Godman's collection are specimens from Sierra Leone, Cape Coast Castle, Winnebah, Senegal, Lower Niger, Sennaar, Abyssinia, and Kimberley, showing that it occurs here and there at wide intervals over a great part of Africa, but does not extend south further than the Orange River. The existence of a *Hypolimnas*, the female of which is modified in imitation of *L. alcippus*, and occurring at the Victoria Nyanza, further indicates that the species exists or formerly did exist there. On the other hand we have received *L. chrysippus* from South, South-western, and Eastern Africa, Madagascar, Comoroo, and Socotra islands, but nowhere have we known it to occur together with *L. Alcippus*, the latter species is indeed omitted from Mr. Trimen's "Rhoph. Africæ Australis."

Judging from its present distribution, it would seem likely that *L. Alcippus* had formerly extended from the Somali Coast through Abyssinia almost in a straight line

to the Gold Coast, and that Southwards its range had passed from Cape Gardafui through the interior to the Nyanza, and thence, still avoiding the coast, had continued downwards to the Orange River. In Asia *L. chrysippus* occurs commonly, but is not accompanied by *L. Alcippus*. On the other hand, a very similar form, *L. Alcippoides*, has been described as occurring in India, of which the authors of Butt. Ind. say, "Its appearance is so erratic over a large extent of country that in distribution as well as in inconstancy of the extent of white, the idea of its being only a casual variety of *L. chrysippus* is suggested;" and looking to this fact, together with the paucity of specimens taken, their co-existence with abundance of *L. chrysippus*, and the probability that an ancestral form would sometimes occur where the entire difference was one of colour, I should have no hesitation in regarding *L. Alcippoides* as a case of reversion. On the other hand, I believe that the tetramorphic type found at Aden represents *L. chrysippus* in its ancestral character, probably preserved through the immigration from time to time of the African forms which occur on the Somali Coast."

Major Yerbury, in his Notes, says, "I have taken *L. dorippus* and *L. chrysippus* *in coitu* so often that I have given up catching them as a curiosity. I have raised caterpillars; there seemed no difference between the caterpillars which turned to *chrysippus* and those that turned to *dorippus*. The chrysalids were of two colours, green with gold spots, and light waxy purple with gold spots."

Some of these intermarried specimens are noted in Mr. Butler's paper (P. Z. S. 1884, 480) as follows:—"Typical female. *Chrysippus* taken *in coitu* at Aden, February 26th, 1883, with Indo-African type (*L. Klugii*); a typical female *L. Dorippus* taken *in coitu* with Indo-African type, Aden, February 29th; a male of the Indo-African type (*L. Klugii*) taken *in coitu* at Aden, February 26th, with typical *L. Chrysippus*, and a male of the Indo-African type taken *in coitu* at Aden, February 29th, with typical *L. Dorippus*."

PARASITES OF *L. CHRYSIPPUS*.—Klug (*Symbolicæ Physicæ*, pl. 37, fig. 9) describes and figures, a species of Chalcis (*C. albicrus*), as being parasitic on *L. Chrysippus*.

LIMNAS ALCIPPOIDES (Plate 9, fig. 2, 2a, b, c, ♂ ♀).

Limnas Alcippoides, Moore, Proc. Zool. Soc. Lond. 1883, p. 238, pl. 31, fig. 1, ♂. Butler, Proc. Zool.

Soc. Lond. 1884, p. 479; *id.* 1886, p. 356. Swinhoe, P. Z. S. 1886, p. 421. Butler, Ann. Nat.

Hist. 1888, p. 133.

Danaüs Chrysippus, var. *Alcippoides*, Distant, Rhopalocera Malayana, p. 408, pl. xl. f. 13, ♂ (1886).

Limnas Chrysippus, var. *L. Alcippoides*, Butler, Annals & Mag. Nat. Hist. 1888, p. 133.

Danaüs (Salatura) Alcippus, Marshall and De Nicéville, Butt. of India, &c., p. 51 (1882).

IMAGO.—Male and female. Forewing of the same bright ferruginous colour as in ordinary Indian specimens of *L. Chrysippus*; white markings also the same.

Hindwing partly ferruginous, the discal borders of the veins being either narrowly or broadly bordered with white, or the whole discal area with portion of the cell entirely white; marginal white-spotted band, cell spots and pouch mark of the male, black. Body and appendages as in *L. Chrysippus*.

Expanse, $2\frac{1}{2}$ to $3\frac{1}{4}$ inches.

HABITAT.—Northern India, Western India (? South India), Rangoon, Singapore.

From the West African race (*L. Alcippus*), this differs in the ferruginous area being paler in tint, in the forewing having a broader series of oblique subapical white spots, the white spot below these—between the upper and middle median veins—much larger, and an additional lower discal white spot on the red area between the middle and lower medians, which is not present in any West African specimens examined. The hindwing is similar, but of less pure white; the extent of the white, characteristic in this race, varies in different specimens, in some it is confined to streaks bordering the outer veins, in others it covers the area below the cell, and again in others, pervades the whole central area of the wing.

DISTRIBUTION.—*L. Alcippoides* is found occasionally throughout the plains of Northern India. It has also been obtained by Gen. G. Ramsay in Nepal. It has also been taken at Panghur, near Neemuck, in September and November. Major Yerbury obtained it at “Campbellpore above Rawul Pindi, 1200 feet, in May, June and July, taking ten or twelve specimens in all.” (Ann. N. H., 1888, 133). Mr. De Nicéville took two specimens at Nurpur in the Punjab, in May. Col. A. M. Lang obtained two specimens at Lucknow, and according to Col. C. Swinhoe, it is scarce in Karachi, “one being taken in January, 1879, others in May and July, and eleven in November and December, 1882.” Also taken at Deesa, at Neemuck in November, and Mhow in June. De Nicéville (J. A. S. Beng. 1885, p. 40) writes:—“A single individual of *L. Alcippoides* has been taken in a garden at Ballygunj, near Calcutta, in March. I have received specimens of this erratic species from Fyzabad in Oudh, from Bholahat in the Malda district, and from Khurda in Orissa.”

We have no record of its capture Southward, but one of the polymorphic forms of the female of *Hypolimnas Misippus*, modified in imitation of *L. Alcippoides*, has been taken on the Nilgiris by Mr. G. F. Hampson, indicating that it does occur or formerly did exist there.

A specimen is also recorded (Butt. Ind. i. 52) from Rangoon.

LIMNAS KLUGII (Plate 9, fig. 1, 1a, ♂ ♀).

Euploea Dorippus, var. Klug, Symbolice Phys. pl. 48, fig. 5 (1829), ♂.

Danaüs Dorippus (part), Marshall and De Nicéville, Butt. of India, i. p. 52 (1882).

Limnas Dorippus (part), Moore, Proc. Zool. Soc. Lond. 1883, p. 238.

Limnas Derippus, Swinhoe, P. Z. S. 1884, p. 504; *id.* 1885, p. 126.

Limnas sp. (unnamed Indo-African type), Butler, Proc. Zool. Soc. Lond. 1884, p. 481.

Limnas Klugii, Butler, Proc. Zool. Soc. Lond. 1885, p. 758; *id.* 1886, p. 356.

IMAGO.—Male and female. Upperside ferruginous. Forewing with the medially-dentate anterior, and exterior margin, and hindwing with the exterior margin, cell spots, and pouch mark in the male, black; the costa generally having the three normal small white medial and apical spots, and the more or less obsolescent marginal white spots, and sometimes one or two white submarginal spots between the upper and middle median veinlets. Underside paler, the black marginal band with more prominent and complete series of white spots; on the forewing are two small white spots outside the black dentation at end of the cell, and, generally, there are two small white subapical spots disposed obliquely between the upper costal spot and the submarginal spot; on the hindwing, the marginal band, cell spots, and pouch mark, are slightly white bordered, the veins also being sometimes white. Thorax, head and palpi black, spotted with white; thorax above white striped; legs black, femora beneath white; abdomen ferruginous, with blackish-bordered longitudinal white stripes and white segmental bands beneath.

Expanse, $2\frac{1}{2}$ to $3\frac{1}{4}$ inches.

HABITAT.—Sind, Kutch, Bombay.

Differs from *L. Chrysippus* in its paler tint of colour, by the absence, on the forewing, of the black apical area, and the oblique subapical white macular-band, as well as the smaller spots below it; the submarginal row of spots is generally absent, and if present consists of the two between the upper and middle median veinlets; the marginal series, consisting of the three at the apex and a few between the median veinlets. Hindwing as in *L. Chrysippus*, except that the marginal white spots are more or less obsolete.

GEOGRAPHICAL DISTRIBUTION.—At Karachi a specimen was occasionally taken by Col. C. Swinhoe (P. Z. S., 1884, 504) “in January, June, July, August, September, November, and December. It was never common. I have no record of its occurrence in the interior of Sind.” Specimens were also obtained by the late Mr. G. H. Wilkinson in Kutch. It is also recorded by Major Yerbury as having been taken in the extreme North-west of India, who obtained it at Campbellpore in May and June (P. Z. S., 1886, 356); and Col. Swinhoe records (P. Z. S., 1884, 504) having taken “two specimens in Bombay in August, others at Poona in October and December, and one at Khandalla in October.” Of its existence further South there would appear to be little doubt, from the fact of the occurrence of one of the polymorphic forms of the female of *Hypolimnas misippus*, modified in imitation of *L. Klugii*, which has not uncommonly been taken on the Nilgiris by Mr. G. F. Hampson.

At Aden, Major Yerbury (Butler, P. Z. S., 1884, p. 481) obtained specimens,

capturing the "male *in coitu* with typical *L. Chrysippus* on February 26th, and a male *in coitu* with typical *L. Dorippus* on February 29th."

On the Somali coast, Major Yerbury also obtained it in April, and Mr. Thrupp took specimens inland, south of Berbera (P. Z. S., 1885, 758).

TOPOMORPHIC ALLIES OF *L. CHRYSIPPUS*.—A darker-coloured topomorphic race (*L. bataviana*, Moore, P. Z. S. 1883, p. 238), inhabits the Island of Java; and a peculiarly coloured race has been described by Dr. Heylaerts as *L. Vigelii* (Comp. Rendus, Soc. Ent. Belg. March, 1884) from the Island of Pulo Bras, off Achen, North Sumatra, as being of a "very soft, beautiful lilac colour, which becomes darker towards the apex of the forewing."

A similar dark-coloured race (*L. cratippus*, Felder, Sitz. Akad. Wiss. 1860, p. 449), occurs in Amboina, Ceram, and Aru; another (*L. Bowringii*, Moore, l.c. 239), is not uncommon in Hong Kong, though doubtfully of racial value, as normal specimens of *L. chrysippus* also occur in the Islands of Hainan, Formosa, Japan and the Philippines.

A small but very distinct race also inhabits Australia, viz. *L. petilia*, Stoll, figured in Cramer's Pap. Exot. Suppl. pl. 28, f. 3. In *L. alcippus* (Cramer, Pap. Exot. ii. pl. 127, f. E, F), which is found here and there at wide intervals over a great part of Africa, we have the race representing the Indian *L. alcippoides*, and in *L. dorippus* (Klug, Sym. Phys. pl. 48, figs. 1 to 4), occurring at Aden and on the Somali coast, that of *L. Klugii*.

BUTTERFLIES WHICH MIMIC SPECIES OF LIMNAS.—The Indian species of *Limnas* are the subjects of unconscious mimicry by the polymorphic forms of the female of *Hypolimnas misippus*, as follows:—

L. chrysippus.—This species is mimicked by the normal female of *H. misippus*, and affords one of the best and most striking examples of protective resemblance. It is commonly found with it in its different Indian habitats,—Ceylon, Nicobars, and Malay Peninsula, as well as at Aden and South Africa.

L. alcippoides is mimicked by a second form of the female of *H. misippus*, which differs from its ordinary female in having the discal area of the upperside of the hindwings white. This form is rarely met with, but has been taken by Mr. Hampson on the Nilgiris, and probably occurs elsewhere in India.

L. Klugii is mimicked by a third form of female of *H. misippus*, which is similarly coloured and without the oblique subapical white markings, as in *L. Klugii*. It occurs less commonly than the normal form of female, and is also recorded from Ceylon and Aden.

Genus SALATURA.

Salatura, Moore, Lepidoptera of Ceylon, i. p. 5 (1880); *id.* Proc. Zool. Soc. Lond. 1883, p. 239.

Euplaea (part), Hübner, Verz. bek. Schmett. p. 15 (1816).

Danaïs (part), Godart, Encycl. Méth. ix. pp. 10 et 172 (1819). Doubleday and Hewitson, Diurnal Lep. p. 89 (1847). Butler, Proc. Zool. Soc. Lond. 1866, p. 43.

Danaïs (sect. *B*, part), Distant, Rhopalocera Malayana, p. 16 (1882).

Danaïs (*Salatura*, sect. *B*, part) Marshall and De Nicéville, Butt. of India, &c., I. p. 49 (1882).

IMAGO.—*Forewing* subtriangular, costa slightly arched, apex more or less rounded, exterior margin waved, oblique, and slightly concave in the middle, posterior margin slightly recurved; costal vein extending to two-thirds the wing; first subcostal branch emitted at one-fifth before end of the cell, second at end of the cell, third and fourth at equal distances beyond its end; cell long; upper discocellular bent inward and angled at lower end above the lower radial, emitting a short discoidal spur within the cell from the lower angle; lower discocellular slender at its upper end, outwardly oblique; radials from angles of upper discocellular; median branches widely separated; submedian slightly recurved and with a short slender veinlet emitted from below near the base. *Hindwing* broadly oval; exterior margin rounded, slightly sinuous; costal vein short, curved upward, pre-costal straight; first subcostal emitted before end of the cell and curving upward before the apex, second slightly bent at end of the cell; discocellulars very oblique, upper shortest and slightly concave, radial from their middle; second median branch from near end of the cell, lower bent near its base; submedian nearly straight, internal vein recurved. *Male* with an open scent-pouch between lower median and submedian vein. *Body* long; palpi pilose; middle and hindlegs slender; antennæ with a gradually formed lengthened slender club.

LARVA with three pairs of fleshy filaments.

Type.—*S. Genutia*.

SALATURA GENUTIA (Plate 10, fig. 1, la, larva, 1b, c, ♂ ♀).

Papilio Genutia, Cramer, Pap. Exot. iii. pl. 206, fig. C,D (1779). Herbst, Pap. vii. pl. 154, fig. 1, 2 (1794).

Limnas ferr. Genutia, Hübner, Samml. Exot. Schmett. Bd. i. pl. 21, fig. 1, 2 (1806).

Salatura Genutia, Moore, Lepidoptera of Ceylon, i. p. 6, pl. 4, fig. 2 (1880); *id.* Proc. Zool. Soc. Lond. 1883, p. 240.

Danaïs Genutia, Distant, Trans. Ent. Soc. Lond. 1877, p. 93; *id.* Rhopalocera Malayana, p. 18, pl. 2, fig. 2 (1882).

Danaïs (*Salatura*) *Genutia*, Marshall and De Nicéville, Bu t. of India, &c., p. 52, fig. on p. 7 (1882).

Papilio Plexippus (part), Fabricius, Spec. Ins. p. 55 (1781)—nec Linnæus.

Euplœa Plexippus (part), Hübner, Verz. bek. Schmett. p. 15 (1816).

Danaïs Plexippus, Godart, Encycl. Meth. ix. p. 186 (1819). Doubleday and Hewitson, Diurnal Lep. p. 92 (1847). Moore, Catal. Lep. Mus. E. I. C. i. p. 124, pl. 4, fig. 6, 6a, larva (1857). Butler, Proc. Zool. Soc. Lond. 1866, p. 47; *id.* Catal. Fabr. Lep. B. M. p. 6 (1869).

Danaïda Plexippus, Aurivillius, Kongl. Vet. Akad. Handl. 1882, p. 69.

IMAGO.—Male and female. Upperside: *Forewing* with the costal margin and apical area curving to the posterior angle, the veins broadly from the base, and

posterior margin brownish-black, the basal interspaces between the veins rich fulvous-red; a series of small white spots above end of the cell, a subapical oblique series of six spots—increasing in length to the fifth, the sixth or lower spot being shorter and rounded, a small outer discal spot between the upper and middle median veins and sometimes a smaller spot is also present between the latter vein and the submedian, a submarginal and marginal series of small spots which are more or less obsolete towards both ends. *Hindwing* with the outer border and the veins broadly black, the interspaces between the veins paler fulvous, the abdominal margin being much the palest; a submarginal and marginal row of small white spots, the inner row more or less obsolescent towards the apex. *Male* with a small subovate scent-pouch situated near the lower median between it and the submedian vein. *Cilia* alternate black and white. *Head*, thorax, and palpi black spotted with white, a dorsal white stripe on thorax and femora beneath; abdomen fulvous-red, with slight white segmental bands beneath. Underside paler, marked as above; apex of forewing rusty-brown; hindwing with all the veins along the fulvous area bordered with white outside their black margins; scent-pouch in male centred with a white streak.

Expanse, $2\frac{1}{2}$ to $3\frac{1}{2}$ inches.

YOUNG CATERPILLAR.—“After first moult $\frac{1}{4}$ inch long, black, dorsal line faint, a lateral line of primrose coloured bidentate patches, two on each segment; abdomen dull black, ventral line faint; prolegs and anal pair black, with a white dash and dot on each; thoracic legs black; head black, with two semicircles of white, one within the other, and a dot of white in front; spiracles white. On each segment are two oval patches of primrose colour, one on each side of the back, three round spots in front, and two maculated white lines behind the same; at the exterior margin of these spots, one on each side on the 2nd, 6th, and 12th segments, is a short velvety tentacula of black colours, those on the 2nd segment longest.

ADULT CATERPILLAR.—After last moult, $1\frac{1}{4}$ inch long; body cylindrical; ground colour and general description as after first moult with one exception, the tentacula are longer and movable ‘ad libitum’ by the caterpillar; each of these tentacula spring from an elevated rufous base with the exception of those on the penultimate segment which are quite black. Transformed to chrysalis on 14th October.

CHRYsalis.—Pendulous; short and thick, much swollen at the base, of a beautiful transparent grass-green colour, tail black, with two little dashes and two spots of black at its base; a transverse dorsal ridge of silver-white, bordered by a distinct interrupted line of black, some freckles on angles and two rows of golden-yellow on the under side, one on either side of ventral line, also five dashes of pale yellow on either side of ventral line. Imago emerged 21st October.” (Chaumette, MS. Notes, Lucknow, 1861.).

HETEROMORPHIC VARIETY.—Mr. E. H. Aitken records (Journ. Bombay Nat. Hist. Soc. 1886, 128) “a specimen caught at Matheran [a Hill Station near Bombay] in December, which has the ground colour throughout of a dull lavender, the markings being of the normal pattern.”

HABITAT.—Throughout India, Burmah, Nicobars, Ceylon.

FOOD PLANTS AND HABITS OF LARVA.—“Feeds on *Raphis pulchellum*; habits solitary, sometimes two or three together” (Chaumette). “Larvæ seldom to be seen, whereas the pupa is very common and one of the handsomest” (Ward, Malabar Notes). “Larva feeding on *Raphis lemma* and *Passularia*” (Grote; Calcutta). “Larva feeding on *Ceropegea intermedia*, in Madras; Pupa, 7th October; Imago, 13th October” (Elliot).

HABITS OF IMAGO.—“Flight easy; fond of flowers, particularly of *Raphanus sativus*. Frequents fields, gardens, and woods alike” (Chaumette).

DISTRIBUTION WITHIN INDIAN AREA.—A widely spread species and only less common than *L. Chrysippus*. In the extreme West, Major Howland Roberts records (P. Z. S. 1880, 405) having observed a single specimen at Rokeran, six miles from Kandahar. North-Westward Major J. W. Yerbury “took a few specimens at Campbellpur in June and July; it was common at Hassan Abdal in June, and seen about Abbottabad in August and September, a single specimen also seen on Thundiani, 8700 feet elevation, in September” (Ann. Nat. Hist. 1888, 133). In Kashmir it was obtained by Capt. R. B. Reed from May to September. Capt. H. B. Hellard took it at Allahabad, Rawul Pindi, and in Kashmir. In Kulu, according to Mr. G. Young, “a few appear in June, and from the middle of August, a succession of broods come out till late in the autumn; in Chumba a few are on the wing in April” (Butt. of Ind. i. 53). Col. A. M. Lang records it as “tolerably common everywhere in the Simla District.” Mr. De Nicéville (Ind. Agriculturist, Jan. 1880) obtained it at Kotgurb, where it was common from July to October. In Kumaon, Mr. W. Doherty says (J. A. S. Beng. 1886, 114) “it is common everywhere there up to Khati, 7000 feet elevation.” Mr. De Nicéville says it is common in the Sikkim Terai, and according to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 300) also “common in Sikkim up to about 5000 feet, during the whole year.” It is also recorded in the list of Major-General G. Ramsay’s Nepal butterflies. Captain Chaumette notes it as “rather common at Lucknow from January to July.” “In the plains of N. India it is common throughout the winter, while in the Himalayas and Khasias it is most common in the autumn” (De Nicéville, Butt. Ind. i. 53). Going Westward, we have Colonel Swinhoe’s record (P. Z. S. 1884, 504) of its “occasional occurrence at Karachi in July and August,” and that “since the recent introduction of the Mulleer Water Works, is now becoming a common insect there during June, July, and August” (J. Bomb. N. H. Soc. 1888), that it is also “common at Mhow from

September to July" (P. Z. S. 1886, 421), and in Bombay and the Dekkun "common all the year round" (*id.* 1885, 125). "On the West Coast it does not appear to be common, at all events in the spring; but in Travancore, according to Messrs. Fergusson and Bourdillon, it is very common in March and fairly common in April" (Butt. Ind. i. 53). Dr. F. Day notes that it is "not rare in Coonoor, and is common below the Ghâts." Mr. G. F. Hampson records it from the Nilgiris, and S. N. Ward from Malabar and Canara. Ascending the East Coast, Mr. W. E. Taylor records it in his list of Orissa butterflies as being "common at Kurda." In the neighbourhood of Calcutta, Mr. De Nicéville (J. A. S. Beng. 1885, 40) says that it is "almost as common as *L. chrysippus*." Mr. Rothney found it "very common at Barrackpur from March to October" (Ent. Mo. Mag. 1882, p. 33). In Cachar, Mr. J. Wood-Mason (J. A. S. Beng. 1887, 345) says it "is a common species, but less widespread than *L. chrysippus*, and occurs with it at all seasons." It is entered in Mr. J. L. Sherwill's recent list of Naga Hill butterflies. In Burmah Commander A. Carpenter, R.N., obtained "both sexes at Myadoung, on the Irrawadi (lat. 23° 43' N.) on the 4th January" (Ann. Nat. Hist. 1886, 182); and has also been taken at Mandalay; it was found in Upper Tenasserim by Mr. Limborg "throughout the cold weather on the Moulayet Hills up to 5000 feet" (P. Z. S. 1878, 822); in Lower Tenasserim specimens were taken at Tavoy (J. A. S. Beng. 1887, 415); and Dr. J. Anderson found it "very common in the Mergui Archipelago in December, January, and February" (J. Linn. Soc. Zool. 1886, 30). In the Nicobar Islands, Mr. R. Meldola took it on Nankowri and Kamorta, in April (P. Z. S. 1877, 582); it occurs also at Kar Nicobar (J. A. S. Beng. 1881, 226) and on Katschall (*id.* 1882, 15). In Ceylon, Mr. F. M. Mackwood notes it as "not very numerous in the low country and middle elevations."

GEOGRAPHICAL DISTRIBUTION OUTSIDE INDIAN AREA.—Malay Peninsula and Singapore (Distant, Rhop. Mal. 18). Penang (Coll. Brit. Mus.). Chentaboon in Siam (H. Druce, P. Z. S. 1874, 103). Madjico Sima (Coll. Brit. Mus.). "Scarce in Formosa" (R. Swinhoe, P. Z. S. 1866, 358), where it has also been taken by Mr. Hobson (P. Z. S. 1877, 810). Island of Hainan (R. Swinhoe, P. Z. S. 1878, 695). S. China: Hongkong (Coll. J. J. Weir). N. China (Coll. Moore).

SALATURA NIPALENSIS (Plate 10, fig. 2, 2a, ♂).

Danais Nipalensis, Moore, Annals and Mag. of Nat. Hist. 1877, p. 43.

Danais (Salatura) Nipalensis, Marshall and De Nicéville, Butt. of India, &c., I. p. 54 (1882).

Salatura Nipalensis, Moore, Proc. Zool. Soc. Lond. 1883, p. 240, pl. 31, fig. 2, ♂.

IMAGO.—Male. Upperside dull ferruginous-black. *Forewing* with the basal half rich fulvous-red, broadly intersected by the black veins; an oblique subapical narrow series of five white spots, the second, third, and fourth are elongated, the

fourth being the longest, the fifth subconical; a medial submarginal series of two and a marginal series of four small white spots. *Hindwing* with the outer border and along the veins broadly ferruginous-black, the inter-spaces between the veins to beyond the disc ferruginous. Head, thorax, and legs black, spotted and streaked with white; abdomen ferruginous. Underside paler ferruginous-black, marked as above.

Expanse, $3\frac{1}{5}$ inches.

HABITAT.—Katmandu, Nepal.

Nearest to *S. Genutia*, from which it may be distinguished by the absence of all white markings, except the narrow oblique subapical series on the forewing. The only known specimen of this peculiarly marked species was obtained by Major-General G. Ramsay during his residency at the Court of Nepal.

SALATURA HEGESIPPUS (Plate 11, Fig. 1, 1a, b, ♂ ♀).

Papilio Hegesippus, Cramer, Pap. Exot. ii. pl. 180, fig. a. (1777), ♀; Fabricius, Spec. Ins. p. 56 (1781); Mant. Ins. p. 27 (1787); Ent. Syst. iii. p. 52 (1793).

Danaïs Hegesippus, Godart, Encycl. Meth. ix. p. 189 (1819); Staudinger, Exot. Schmett. p. 49, pl. 25, ♂ (1885).

Danaïs (Salatura) Hegesippus, Marshall and De Nicéville, Butt. of India, &c., I. p. 55 (1882).

Salatura Hegesippus, Moore, Proc. Zool. Soc. Lond. 1883, p. 241.

Danaïs melanippe, Gray, Lep. Ins. of Nepal, p. 10, pl. 9, fig. 1 (1846).

Danaïs melanippus, var. *Hegesippus*, Butler, Proc. Zool. Soc. Lond. 1866, p. 49; Snellen, Tijds. voor Ent. xix. p. 144 (1876); xx. p. 66 (1877). Distant, Rhopalocera Malayana, p. 19, pl. 2, fig. 1 (1882), ♂.

IMAGO.—Male and female. Upperside: *Forewing* with the black apical area and fulvous-red basal interspaces between the veins and series of white spots, as in *S. Genutia*, except that the fulvous streak from below the base of the submedian is absent, the subapical white spots are less prominent, shorter, and are separated by broad black veins, the upper discal spot is very much smaller, and situated below the inner end of the preceding spot; some specimens have two lower discal white spots, the lowest being situated at the end of the fulvous streak above the submedian vein. *Hindwing* brownish-black, or black, the cell area and sharply-defined outer inter-spaces between the veins are pure white, the latter being restricted to narrow short streaks, which in some specimens are sullied with fulvous at their edges; the submarginal and marginal series of white spots always complete. *Male with a small suboval scent-pouch*, situated near the lower median between it and the submedian vein. Underside similar to the upperside, with all the white markings more prominent. On the hindwing the white interspaces between the outer veins are broad and suffused at their end with fulvous, the costal base also being fulvous.

Expanse, $2\frac{3}{4}$ to $3\frac{1}{4}$ inches.

HABITAT.—Lower and Eastern Bengal; Lower Burma; Malay Peninsula.

DISTRIBUTION WITHIN INDIAN AREA.—This species does not appear to be common anywhere. Mr. W. S. Atkinson notes its occurrence in the plains of Bengal. Mr. De Nicéville, who has carefully collected in the neighbourhood of Calcutta, notes (Butt. Ind. i. 55), "On November 15th and December 18th, 1878, taking two specimens in a garden on the outskirts of Calcutta," and (J. A. S. Beng. 1885, 40) says, "It is a decidedly rare species here, I having seen only seven specimens in all, four taken by myself in the two last months of three successive years, one taken by Mr. W. Doherty, also in the cold weather, and one in March in a garden at Ballygunj, all except the last being taken in the Sealdah District." Specimens of both sexes taken at Mutla in September, 1887, are in Col. Swinhoe's collection, and Capt. Hellard has it from the Sunderbunds. It is recorded in Mr. W. C. Taylor's list of Orissa butterflies, as "not common at Khurda." In Lower Burma, Capt. E. H. E. Adamson (J. A. S. Beng. November, 1882) records it from Akyab, who took specimens "in July, in company with *S. Genutia*, *L. chrysippus* *T. septentrionis* and *S. Gautama*." It occurs not uncommonly at Rangoon from July to October; and also at Moulmein. Dr. J. Anderson obtained it in the Mergui Archipelago in December (J. Linn. Soc. Zool. 1886, 30).

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant records it (Rhop. Malayana, 19) from Malacca and Province Wellesley, Malay Peninsula. There is a specimen in the British Museum collection from Pinang, and I have a single specimen from Singapore.

HABITS OF IMAGO.—Mr. De Nicéville, in observing specimens in a garden near Calcutta, says (Butt. Ind. i. 55), "It seems to have a lower, and, if possible, lazier flight than *S. Genutia*, from which species, by reason of its white-striped lower wings, it is easily distinguishable on the wing."

SALUTURA NESIPPUS (Plate 11, fig. 2, 2a, b, ♂ ♀).

Danaïs Nesippus, Felder, Verh. Zool. Bot. Gesch. xii. p. 486 (1862); *id.* Reise Novara, Lep. 11, p. 347 (1867); Moore, Proc. Zool. Soc. Lond. 1877, p. 582.

Danaïs Hegesippus, var. *Nesippus*, Wood-Mason and D'Nicéville, Journ. Asiat. Soc. Beng. 1882, p. 15.

Danaïs (Salatura) Nesippus, Marshall and D'Nicéville, Butt. of India, &c., I. p. 55 (1882).

Salatura Nesippus, Moore, Proc. Zool. Soc. 1883, p. 241.

IMAGO.—Comparatively smaller than *S. Hegesippus*. Upperside duller in colour throughout, the black being of a fuliginous shade, especially on the hindwing, the fulvous area darker, and the white markings much duller. On the *forewing* the subapical series of spots are narrower, and the two marginal series of small white spots are generally complete at their upper end. On the *hindwing* the white discal interspaces are narrower and shorter. *Male with a small subovate scent-pouch* situated near the lower median between it and the submedian. Underside also

duller coloured than in *S. hegesippus*; hindwing with the white discal interspaces broader and more sullied with fulvous.

Expanse, $2\frac{1}{2}$ to 3 inches.

HABITAT.—Nicobar Islands (Sambelong, Nankouri, Kar Nicobar).

INDO-MALAYAN ALLIED SPECIES OF SALATURA.—*S. intensa* (Moore, Proc. Zool. Soc. 1883, 240); nearest to *S. genutia*; smaller in size; both wings more intensely red. Larva figured by Horsfield "Catal. Lep. Mus. E.I.C." pl. 3, fig. 8 (1829). *Habitat.* Java; Lombok; Borneo.—*S. intermedia* (Moore, P. Z. S. 1883, 241); described and figured in Distant's "Rhop. Malayana," p. 18, pl. 2, fig. 3, ♂, as a variety of *S. genutia*; both sexes with the hindwing interspaces white. *Habitat.* Malacca; Singapore.—*S. sumatrana* (Moore, P. Z. S., 1883, 242); both sexes with darker red area on forewings, and narrower series of white subapical spots; the hindwing having broad white interspaces with sullied red ends, and small marginal spots. *Habitat.* Sumatra.—*S. melanippus* (Cramer, Pap. Exot. 11, pl. 127, fig. A, B); with pale red area on forewing, and red interspaces on the hindwing. *Habitat.* Java.—*S. Eurydice* (Butler, Ann. Nat. Hist. 1884, 58); a very dark species, with a narrow sullied-red area on forewings, the hindwings being dark brown with obsolescent red interspaces. *Habitat.* Nias Island.—*S. Lotis* (Cramer, Pap. Exot. 111, pl. 230, fig. D, E); both wings with white interspaces, those on the hindwings being narrow. *Habitat.* Borneo (Labuan, Sandakan).—*S. Edmondi* (Bougainville, Voy. Thetis, 11, 344, pl. 44, fig. 3); both wings with broad white interspaces. Also figured in Semper's Reisen Archipel. Philippen, pl. 3, fig. 4, 5, ♂. *Habitat.* Philippine Islands (Bohol, Mindanao, Luzon).—*S. Abigar* (Eschscholtz, in Kotzebue's Reise, 111, 209, pl. 7, fig. 12); also described and figured in Distant's "Rhop. Malayana," p. 409, pl. 42, fig. 11. *Habitat.* Philippines, Malay Peninsula.

BUTTERFLY MIMICKS OF SPECIES OF SALATURA.—*S. genutia* is mimicked in Upper India by the females of *Elymnias undularis*; in South India by the females of *E. caudata*, and in Ceylon by the females of *E. fraterna*. According to Colonel Swinhoe, *S. hegesippus* is mimicked in Rangoon, Burma, by the females of an *Elymnias* (? *tinctoria*) having similar whitish hindwings.

Genus BAHORA.

Bahora, Moore, Proc. Zool. Soc. Lond. 1883, p. 245.

Danaïs (*Parantica*, Sect. A, part), Marshall and D'Nicéville, Butt. of India, &c., I. p. 35 (1882).

Danaïs (Sect. A, part), Distant, Rhopalocera Malayana, p. 13 (1882).

IMAGO.—Male with comparatively narrower forewings than in *Parantica*. Forewing with the first subcostal emitted at one-fifth before end of the cell and free from the costal; discocellulars bent below the lower radial, and emitting a short spur within the cell from the angle, lower discocellular slender at its upper end. Hindwing more

arched at the base of the costa, the exterior border more even throughout, and oblique below the apex, and convexly angular beyond the middle, thus giving this wing a decided quadrate form; the abdominal margin being also longer. *Male with two similarly disposed spatular-shaped impressed patches of scent-scales*, each with slight corresponding thickening of the vein. Female with rounded exterior margins.

Type.—*B. philomela*.

BAHORA CROCEA (Plate 12, fig. 1, 1a, ♂ ♀).

Danaüs Crocea, Butler, Proc. Zool. Soc. Lond. 1866, p. 57, pl. 4, fig. 5, ♂; *id.* Trans. Linn. Soc. Zool. (1877), p. 536.

Danaüs (Parantica) Crocea, Marshall and D'Nicéville, Butt. of India, &c. I. p. 37, pl. 5, fig. 6, ♂ (1882).

Bahora Crocea, Moore, Proc. Zool. Soc. Lond. 1883, p. 245; *id.* Journ. Linn. Soc. Lond. Zool. xxi. p. 30 (1886).

Danaüs (Bahora) Crocea, Elwes and D'Nicéville, Journ. Asiat. Soc. Beng. 1886, p. 415.

Danaüs Aspasia, var. *Crocea*, Distant, Rhopalocera Malayana, p. 13, pl. 1, fig. 7, ♂ (1882).

IMAGO.—Male and female. Upperside dark brown-black. **MALE**: *Forewing* with a whitish-hyaline broad trifold cell streak, three narrow costal spots towards the apex, two lengthened narrow subapical streaks, below which are three outer discal somewhat broad quadrate spots, two larger inner discal spots which sometimes slightly touch the outer spots, a broad streak below the cell, a submarginal row of eight small spots and sometimes a short lower streak at the posterior angle, a marginal row of more or less defined smaller spots; the cell-streak in the male is sometimes sullied with dark scales, and the streak below the cell is suffused with yellow. *Hindwing* with the cell, the costal, short inner discal, and longer marginal interspaces yellow, the outer discal spots, the submarginal, and marginal series of spots more or less defined. *Male with two spatular-shaped patches of scent-scales*, a large patch on the lower median and a small one on the submedian. **FEMALE** with all the markings, including the marginal rows of spots on both wings more prominent, and the discal spots on the forewing well separated. *Body* black, head and thorax white spotted, a dorsal white streak on thorax, front of palpi and femora beneath white, abdomen above brown, whitish beneath.

Expanse ♂ $2\frac{1}{2}$ to 3, ♀ $2\frac{3}{4}$ to $3\frac{1}{4}$ inches.

HABITAT.—Lower Burma; Tenasserim.

In the British Museum Collection there is a male specimen of *B. crocea* labelled "Assam" and a female specimen labelled "Nepal." Both of these localities may be and are doubtless erroneous, and also probably that of "Tranquebar" given by Fabricius, as the habitat of the allied *B. Aspasia*, and also that of Jounpur, N.-W. Provinces, given by F. J. Atkinson (Ent. Mo. Mag. 1867, p. 60) for a butterfly which

he there erroneously identified as *B. Cleona*—an allied species occurring only in Celebes. No specimen of either *B. crocea* or *B. aspasia* has been authentically identified as having been captured in any part of the Indian Continent.

In the Banksian Collection (now in the British Museum), containing the original types of many of the Fabrician described species, there are two specimens, a male and female, labelled "Asia," which Mr. Butler, in his "Catalogue of Diurnal Lepidoptera, described by Fabricius," p. 7, No. 17, has assigned to *B. aspasia*. These two Fabrician specimens agree in every respect, and are identical with Bornean specimens also in the British Museum, and other Collections, which have been examined. The Fabrician specimens of *B. aspasia* here referred to, are smaller in size than those of the same sex of *B. crocea*, and have all the transparent markings smaller in both sexes.

DISTRIBUTION WITHIN INDIAN AREA.—The only authentic records of the capture of this species within our limits is from Burma. Mr. De Nicéville (Butt. Ind. i. 37) records it from Kyook Phyou, Arakan. Messrs. Elwes and De Nicéville (J. A. S. Beng. 1887, 415) records two specimens taken at "Tavoy in March," and Dr. J. Anderson (J. Linn. Soc. Z. 1886, 30) took two specimens at "Mergui in December, and one on Elphinstone Island in March."

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. W. L. Distant (Rhop. Malay. 13) gives Province Wellesley and Malacca, and "Pinang in Aug. and September." It occurs also at Singapore, Sumatra, and Nias.

INDO-MALAYAN ALLIED SPECIES OF BAHORA.—*B. Aspasia* (Fabr. Mant. Ins. 11, 15. Identified, as stated above), with specimens from Borneo.—*B. philomela* Zinken-Sommer, Akad. Nat. Cur. 1831, 184, pl. 16, fig. 17. *Habitat.* Java.

BUTTERFLY MIMICKS OF SPECIES OF BAHORA.—*B. crocea* is mimicked, apparently, by one of the forms of the female of *Nepheronia hippia*, which is occasionally found in certain parts of the Indian Continent, and in which the basal interspaces of the hind-wings are prominently suffused with yellow, from which fact it is presumable that *B. crocea* does or did exist there. *B. philomela*.—This species is also mimicked, in Java, by a form of the female of *Nepheronia*, namely *N. valeria*, the latter having the basal interspaces on both wings suffused with yellow, as is the case in *B. philomela*.

Genus PARANTICA.

Parantica, Moore, Lep. of Ceylon, i. p. 7 (1880), *id.* Proc. Zool. Soc. Lond. 1883, p. 247.

Danais (*Parantica*, Sect. *B*, part), Marshall and De Nicéville, Butt. of India, i. p. 35 (1882).

Danais (Sect. *A*, part), Distant, Rhop. Malayana, p. 13 (1882).

IMAGO.—*Forewing* long, narrow, hind margin lengthened; first subcostal branch emitted at one-fourth before end of the cell and touching the costal near its end, second branch from immediately before end of the cell; the cell long and narrow; upper

discoellular bent below the lower radial, producing a short discoidal spur within the cell from the angle, lower discoellular slender at its upper end. *Hindwing* somewhat elongated, exterior margin very convex, abdominal margin short; costal vein arched from the base and extending along edge of the costa; cell very long and narrow. *Male with two spatular-shaped patches of scent-scales*, one, the largest, situated on the lower median veinlet, the other, about one-fourth its size, on the submedian vein, both near the end, and from which, in some specimens on the underside, project innumerable short white filaments between the scales, each patch showing on the underside a slender swelling of the vein at that part. *Antennæ* with lengthened slender tip; apical joint of palpi short, pilose.

LARVA with two pairs of fleshy filaments.

Type.—P. Aglea.

GEOGRAPHICAL DISTRIBUTION OF THE SPECIES OF PARANTICA WITHIN INDIAN AREA.—Their geographical range seems to be widely separated. No species of this genus occurs (has certainly not been recorded) north of the Bombay Presidency—where *P. aglea* occurs—till *P. melanoides* is met with in the N.-W. sub. Himalayas on the West. Of the East Coast fauna our knowledge is very limited at present, but as yet *P. melanoides* has not been recorded from any place south of Assam in India proper, while *P. aglea* is not known to extend up the East Coast further north than Madras (excepting in the doubtful instance noted by Mr. Rothney (*Ent. M. Mag.* 1882, 33) as having taken it at Barrackpore, near Calcutta), and *P. melanoleuca* is confined to the Andamans; whilst *P. agleoides* is restricted to the Nicobars and Lower Burma. The only other described species of this group occurs outside our area, namely, *P. Eryx*, of which the known and recorded habitats are Borneo, and the island of Nias off W. Coast of Sumatra.

PARANTICA MELANOIDES (Plate 12, fig. 3, 3a, ♂ ♀).

Parantica Melanoides, Moore, Proc. Zool. Soc. Lond. 1883, p. 247; *id.* Journ. Linn. Soc. Zool. xxi. p. 30 (1886).

Danaïs (Parantica) Melanoides, Elwes and D'Nieville, Journ. Asiat. Soc. Beng. 1886, p. 414.

Danaïs (Parantica) Aglea, Marshall and De Nicéville, Butt. of India, &c., I. p. 38, pl. 6, fig. 7, ♂ ♀ (1882).

Danaïs Aglaia, Doherty, Journ. Asiat. Soc. Bengal, 1886, p. 113.

IMAGO.—Compared with S. Indian specimens of *P. Aglea*, this is distinguishable by its somewhat larger wings, especially of the males, the conspicuously broader and more clearly defined subhyaline bluish-white markings. On the forewing, the discoidal streak is broader and almost entire, being but slightly cleft at the end; the interspace below the cell is traversed by a very slender black line, which does not divide the end. On the hindwing, the basal and discal interspaces are also much

broad, the discoidal interspace being traversed by a thinner bifid line. *Male with a large spatular-shaped patch of scent-scales on the lower median vein, and a smaller patch on the submedian vein.*

Expanse, 3 to 3 $\frac{3}{4}$ inches.

HABITAT.—Sub-Himalayas; Assam; Upper and Lower Burma; Tenasserim.

DISTRIBUTION.—According to Mr. De Nicéville (Butt. Ind. i. 39) this species “inhabits the region of heavy rainfall in North-east India, extending westward along the Submontane Terai to the Sutlej, but common only towards the East.” Capt. R. B. Reed obtained it in Kashmir; Capt. Hellard obtained it at Masuri in Sept. and October, and Col. Swinhoe has a specimen taken by Capt. Reed in Solun in May. “A single specimen was taken by Mr. De Nicéville in a garden about 1000 feet below Simla in July; three others were taken in November at Naiashahr in the Saharunpur District, and a specimen in the Indian Museum, Calcutta, is from Masuri, but in the N.W. Himalayas it is decidedly a rare insect.” (Butt. Ind. i. 39). In Kumaon, Mr. W. Doherty (who applies to it the name “*Aglaiia*”) says (J. A. S. Beng. 1886, 113), it is “common in the Tarai and in the Sarju and Káli valleys up to 4000 feet elevation.” In Sikkim “it was taken by Mr. O. Müller in the Great Runjit valley at 1200 feet elevation, and in the Darjiling tarai and up to 6000 feet elevation in the Hills, Mr. De Nicéville found it plentiful in October (Butt. Ind. i. 39). Mr. J. H. Elwes states also (Tr. Ent. Soc. 1888, 299), that it is “common in the terai and up to about 6000 feet from March to December.” It is also enumerated in my list of Major.-Gen. Ramsay’s Nepal butterflies, and I have a specimen from Buxa in Bhotan. In the Khasia Hills it occurs in November, is “common in Cachar from April to June, and on Nemotha (3634 feet) in Sept. and October” (J. A. S. Beng. 1887, 345). It also occurs at Sibsagur in Assam, and Mr. J. L. Sherwill recently obtained it on the Naga Hills. In Burma it has been obtained at Bhamo in December, a specimen received from Mr. Noble being in Col. Swinhoe’s collection. Mr. Limborg took it in Upper Tenasserim in the winter at 3000 to 6000 feet elevation (P. Z. S. 1878, 822). “Capt. C. T. Bingham also found it there commonly in February, up to 1500 feet, and again in August to November.” In Lower Tenasserim “a few were taken in Tavoy, Ponekai, and adjacent hills” (J. A. S. Beng. 1887, 415) Dr. J. Anderson took it at “Mergui in December” (J. Linn. Soc. Z. 1886, 30).

PARANTICA AGLEA (Plate 13, fig. I. larva and pupa, 1a, b, c, d, ♂ ♀.)

Papilo Aglea, Cramer, Pap. Exot. IV. pl. 377, fig. E. (1781) ♂. Herbst, Nat. Ins. VI. pl. 125, fig. 5 (1793).

Danais Aglea, Doubleday and Hewitson, Diurn. Lep. p. 92 (1847). Butler, Proc. Zool. Soc. Lond. 1866, p. 54.

Danaida Aglea, Aurivillius, Kongl. Vet. Akad. Handl. 1882, p. 99.

Parantica Aglea, Moore, Proc. Zool. Soc. Lond. 1883, p. 248.

Danaïs grammica, Boisdual, Spec. Gén. Léop. i. pl. xi. fig. 10 ♂ (1836). Doubleday and Hewitson D. Lep. p. 92 (1847).

Danaïs Ceylonica, Felder, Verh. Zool. Bot. Gesellsch. xii. p. 479 (1862).

Parantica Ceylonica, Moore, Lep. of Ceylon, i. p. 8, fig. 2 ♀ 2a, larva (1880).

Danaïs (Parantica) Ceylonica et grammica, Marshall and D'Nicéville, Butt. of India, pp. 39, 40 (1882).

Papilio Similis (part), Linn. Mus. Ulr. p. 299 (1764).

IMAGO.—Male and female. Upperside dark fuliginous-black. *Forewing* with a subhyaline bluish-white discoidal streak which is well divided anteriorly into three parallel portions, the two upper being very slender, especially in the male; a lengthened streak below the cell, traversed by a broad, pointed, central black line, the outer point sometimes cutting through the end; five discal spots; two subapical slender short streaks; three small costal spots above; a submarginal row of spots, and a mostly complete marginal row of much smaller spots; a pale slender line along base of the costal border and a less defined posterior basal line. *Hindwing* with broad subhyaline bluish-white discoidal streak traversed by a broad black bifid line, the points of which sometimes cut through the end; a discal series of broad spots, the two lower of which have a contiguous or sometimes conjoined outer spot; a submarginal row of small spots and a marginal row of smaller spots, both these rows in the male being relatively smaller and the outer row mostly incomplete. *Male with a large spatular-shaped patch of scent-scales* on the lower median veinlet and a small patch on the submedian vein, both veins being dilated at that part. Head and thorax white spotted, a dorsal streak on thorax, palpi and femora beneath white; abdomen brown above, paler beneath. Underside dark brown; markings more clearly defined; forewing with the lower subapical white streak longer and dilated at the outer end, which is concave; the upper discal spot also larger and concave externally; hindwing with the two upper discal interspaces elongated and in the female sometimes confluent with the corresponding submarginal and marginal spots; sexual marks in male black, the traversing vein numerous white scaled.

Expanse, $2\frac{3}{4}$ to $3\frac{1}{2}$ inches.

ADULT CATERPILLAR.—Cylindrical; ground colour reddish-purple; two pairs of black filaments on third segment and two on twelfth segment; two subdorsal rows of round chrome-yellow spots with several intervening transversely disposed small narrow white spots; a lateral series of white dots, below which is a sublateral row of chrome-yellow spots; head, under surface and legs black; head and legs white spotted. Fig. 1a, on our plate 13, is from Mr. S. N. Ward's Malabar drawing, and figs. 1 from Dr. Thwaite's Ceylon drawings.

CHRYsalis.—Green; much constricted behind the thorax, front and wing cases with blue and golden dots, anal segments above with raised black dots.

HABITAT.—South India ; Ceylon.

HABITS OF IMAGO.—Mr. Hutchison (Lep. Ceylon, i. 8), states that it “affects open or partially cultivated places, but is not often seen in forest. Flight slow and heavy.”

FOOD PLANTS OF LARVA.—Feeds on *Tylophora carnosa*, an Asclepiad, in Bombay (Aitkin). On *Calotropis* in Ceylon (Thwaites).

DISTRIBUTION WITHIN INDIAN AREA.—On the Continent of India it has been obtained by Colonel Swinhoe (P. Z. S. 1885, 125) in “Bombay in July at Mahableschwur, at Khandalla in October, at Poona in June, November and December, and at Belgaum.” Mr. E. H. Aitkin states (Journ. Bombay Nat. Hist. Soc. 1886, 128) that it “is very common on hills, but comparatively rare in Bombay, coming out a little later than *T. Limniace*, but is very abundant about the end of December. I found the larva at Lanowlie in October, feeding on *Tylophora carnosa*, an Asclepiad. The ground colour of the larva is a rich reddish-brown or claret colour, and on each segment is a pair of round yellow spots with numerous small bluish-white spots between, these spots on the sides being gathered into a conspicuous longitudinal band; the under surface is black; it has only two pairs of filaments, which are nearly straight.” “A number of specimens were taken by Mr. G. Vidal in the South Koncan; on the Ghâts and on the Goanese frontier at 1500 to 1700 feet elevation at the latter end of March, and in Belgaum it is common in October. In Calicut it has been taken in September, at Bangalore in August and November. It has been taken in Travancore by Messrs. Bourdillon and Fergusson; in August in the hills near Trevandrum, and in the Ashamboos range in May” (Butt. Ind. i. 40). It was also taken in Malabar by Mr. S. N. Ward. Mr. G. F. Hampson records it (J. A. S. Beng. 1888, 347) from the Nilgiris. On the island of Ceylon, Mr. Hutchison states (Lep. Ceylon, i., p. 8) that it is “found everywhere all the year in open or partially cultivated places, but not often in forest, and is perhaps the commonest insect in Ceylon.” Mr. F. M. Mackwood in his Ceylon “Notes” says that it is “numerous in the lower and middle elevations, and fairly common in the higher.”

DISTRIBUTION OUTSIDE INDIAN AREA.—Though not recorded by Mr. Distant in “*Rhopalocera Malayana*” he refers (p. 13) to Crüger’s notice (Verh. Nat. Unterh. Hamburg, iii. 29) of the occurrence of this species at Malacca, as probably resting “on a mistaken identification.” In Sumatra it was obtained by Mr. Carl Bock. Dr. Boisduval gives the locality of “Java” to his figure of “*grammica*,” in the list of plate xi. of his “Species Gén. Lép.” and I have a single female of undoubted *grammica*, from Java, which does not show any appreciable difference from the same sex from Ceylon and S. India.

PARANTICA MELANOLEUCA (Plate 24, fig. 2, ♀, ♂).

Parantica melanoleuca, Moore, Proc. Ent. Soc. Lond. 1877, p. 381, pl. 38, fig. 3, ♂. Wood-Mason.

Journ. Linn. Soc. Bengal, 1880, p. 215.

Parantica melanoleuca, Marshall and D'Neirville, Brit. of India, &c., I. p. 38 (1862).

Parantica melanoleuca, Moore, Proc. Ent. Soc. Lond. 1883, p. 245.

HOUSER.—Male and female; upperside black. *Forewing* with a broad white subhyaline discoidal streak, which is slightly divided into three portions anteriorly, a lengthened streak traversed by a central slender black line below the cell and extending also below the submedian vein, four discal spots of which the two upper are the smallest, an indistinct basal costal streak, three costal spots before the apex, two lower elongated streaks followed by a dentate spot, a submarginal row of spots of which the upper two are more or less indistinct, and a marginal lower row of very small spots. *Hindwing* with a white subhyaline space traversed by a slightly bidd black line within the cell, a discal series of broad short streaks of which the three upper are concave and the two lower convex externally, the lower with an indistinct dusky lunule covering their end; the streak between the lower median and submedian and a line between the lower median and abdominal margin both traversed by a black line; a submarginal series of small white spots, disposed two by two (except on the male external mark), and an incomplete marginal series of smaller spots. Male with a large apical-arch-shaped patch of scurf-scales on the lower median, and a small patch on the submedian. Head and thorax with white spots and streaks; abdomen cinereous-brown above, white beneath; palpi, femora and tibiae white streaked.

Underside with the submarginal and marginal series of spots larger and complete on both wings; on the forewing the subapical spots are also larger, the lower streak broader and longer, the latter and the lower spots both being concave externally; in the hindwing the lower median white spaces and the subcostal space are shortened, the two upper discal spaces being lengthened.

HABITAT.—South Andamans.

DISTRIBUTION AND HABITS.—Only as yet known from the Andamans. It appears to be common at Port Blair, where it is on the wing throughout the year. (Burr. Ind. I. 38.)

PARANTICA AGLEOIDES (Plate 24, fig. 1, ♀, ♂).

Parantica Agleoides, Feltz, Voy. Ent. Muséum IV. p. 306 (1860); G. Ent. Soc. French. 1861,

p. 296. Burr. Proc. Ent. Soc. Lond. 1866, p. 55. Moore, Proc. Ent. Soc. Lond. 1877, p. 381.

Wood-Mason, Journ. Linn. Soc. Bengal, 1880, p. 215; G. 1882, p. 55. Deane, Bengal. Museum, p. 25, pl. 2, fig. 5 (1882).

Parantica (Parantica) Agleoides, Marshall and D'Neirville, Brit. of India, &c., I. p. 42 (1862).

Parantica Aylmeri, Moore, Proc. Zool. Soc. Lond. 1866, p. 166.

Danae grammica, apud Butler, Trans. Linn. Soc. Zool. 1877, p. 366. Moore, P. Z. S. 1877, p. 561.

IMAGO.—A shorter insect than *P. aplea*, of less apical prolongation of the forewings; with smaller bluish-white subapical markings, and distinguishable from it by the streaks being much narrower, and all the spots smaller in size. On the upper-side of the *forewings* the discoidal streak is clearly divided into three, the middle division being generally broader than the upper; the basal postal-line is well defined, the basally-joined streak below the cell is very broadly divided through the centre to the end, the end being generally open; the two subapical streaks are short, and only half the length of those in *P. aplea*. On the *hindwing* the cell-innerspace is well divided into three slender portions, but cut by the broad black forked-line to the end, the central-end portion being free in the male but joined to the lower portion in the female; the discal series of spots are small, the lower basal streaks narrow, and are both widely separated; the submarginal and marginal series of spots small. Under-side paler; marked as above; the area of the sexual marks black, with their traversing vein white scaled.

Expanse $2\frac{1}{2}$ to 3 inches.

HABITAT.—Nicobars; Lower Burma.

DISTRIBUTION WITHIN INDIA.—In the Nicobar Islands Mr. F. M. de Beestock (Bett. Ind. i. 41) "obtained numerous specimens on Nankow in August and September, on Great Nicobar (Sumbelung) in October"; it occurs also on Kar Nicobar, Palo Kondal, Trinkat, and Katschall. Mr. B. Mohr took it on Kamorta in April. In Lower Burma it has been taken at Yomgbook, Akyah, in Arakan in March. "It occurs commonly at Rangoon in January, July, September, and December, and probably at other seasons also" (Bett. Ind. i. 41). Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 80) took it commonly in the "Mergui Archipelago from December to March."

DISTRIBUTION OUTSIDE INDIA.—Mr. Distant (Rhop. Malay. 15) records it from Province Wellesley and Malacca in the Malay Peninsula. It also occurs on Sumatra and Java.

INDO-MALAYAN ALLIED SPECIES OF PARENTHESIS.—The species of *Parantica* do not occur outside the Indo-Malayan region, and the only other described species is *P. Eryx* (Fabricius Ent. Syst. Suppl. p. 423) figured by Mr. Butler in "Catal. Faun. Lep. in Brit. Mus." pl. 1, fig. 2), and by Dr. Standinger in "Ent. Schmidt," p. 40, pl. 24, under the name of *Borneensis*. *P. Eryx* is a much blacker and somewhat smaller insect than its nearest ally, *P. Aylmeri*, with similarly disposed subapical markings, the basal streaks throughout both wings being extremely slender, and all the spots very much smaller. Its expanse is from $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

HABITAT.—Borneo. On the Island of Nias off the west coast of Sumatra, specimens of *P. Eryx* have been taken, which are even darker in colour and have less distinct markings, than those from Borneo.

Genus CADUGA.

Caduga, Moore, Proc. Zool. Soc. Lond. 1882, p. 235; *id.* 1883, p. 249.

Danaïs (section A, part), Distant, Rhopalocera Malayana, p. 14 (1882).

Danaïs (*Chittira*, section A, part), Marshall and De Nicéville, Butt. of India, &c., I. p. 42 (1882).

IMAGO.—*Forewing* elongated, narrow, triangular, apex subfalcate; first subcostal branch emitted at one-fifth before end of the cell, free; second branch from end of the cell; the cell long and narrow; upper discocellular bent below lower radial and producing a short spur from the angle within the cell, lower discocellular slender at its upper end. *Hindwing* elongated anteriorly, outer margin very convex, the costa straight; costal vein long, slightly curved and extending along the margin; cell long and narrow. *Male with two spatular-shaped patches of scent-scales, the largest on the submedian vein, the other on the internal vein*, both situated near their end; each patch traversed by a lengthened dilatation or swelling of the vein, also a similar contiguous spatular-shaped patch of scales on the lower median veinlet on the upperside and underside of the wing, but which is not accompanied by a traversing dilatation of the vein; on the underside of the wing, from these patches, project numerous short raised pure white scales and longer slender white filaments. *Antennæ* with a regularly-formed clavate tip; apical joint of palpi large, stout, pointed.

Type.—*C. Tytia*.

CADUGA MELANEUS (Plate 14, fig. 2, 2a, b, ♂ ♀).

Papilio melaneus, Cramer, Pap. Exot. i. pl. 30, fig. D (1775).

Danaïs melaneus, Godart, Encycl. Méth. ix. p. 192 (1819). Doubleday and Hewitson, Diurn. Lep. p. 93 (1847). Butler, P. Z. S. 1866, p. 55; *id.* Trans. Linn. Soc. Zool. (1876-9), p. 536.

Danaïs melaneus (part), Distant, Rhopalocera Malayana, p. 14 (1882).

Danaïs (*Chittira*) *melaneus*, Marshall and De Nicéville, Butt. of India, &c., p. 43, pl. 5, fig. 5, ♂ ♀ (1882).

Hestia Ephyre, Hübner, Verz. bek. Schmett., p. 15 (1816).

IMAGO.—Male. Upperside: *Forewing* dark black, with greyish-white markings disposed the same as those in *C. tytia*, and of the same shape, except that on the forewing, the spot below the subapical elongated streak is smaller and oval in form, and the four discal spots are less quadrate, smaller, and wider separated. *Hindwing* dark purplish-brown, the greyish-white cell area is not traversed by a bifid line (as is always the case on this wing in *C. tytia*), there is a contiguous small spot outside each of the two lower discal spots, and the submarginal and smaller marginal white spots are apparent in both sexes. *Male with two similar blackish spatular-shaped patches of scent-scales*. Female similar above, the underside being of a brighter

tone of purple-brown. Underside.—*Forewing* dark purplish-brown, blackish clouded between the discal markings on the forewing, and black on the sexual-mark areas. *Hindwing* brighter coloured, with all the markings more prominent.

Expanse, $3\frac{1}{2}$ to 4 inches.

HABITAT.—Eastern Himalayas; Assam; Khasia Hills; Burma.

DISTRIBUTION WITHIN INDIAN AREA.—It is entered in my list of Gen. Ramsay's Nepal collection. According to Mr. De Nicéville (J. A. S. Beng. 1881, 49) it is "common in the Sikkim Terai and the wooded slopes below Chunarabatti in October; subsequently finding it in the Terai in profusion, and as high as 6000 feet in the Darjeeling Hills, it being apparently a forest-loving insect similar in habits to *C. tytia*," and Mr. J. E. Elwes (Tr. Ent. Soc. 1888, 300) says it is "common in the low valleys and found up to about 6000 feet, from March to December." It is found in Silhet; and "in the Khasia Hills in November." In Cachar, Mr. Wood-Mason records it (J. A. S. Beng. 1886, 345) as being taken on "Nemotha peak, 3634 feet elevation, in October." It occurs at Sibsagur in Assam, and Dr. G. Watts (Ann. N. H. 1885, 299) obtained it in Manipur. It is also entered in Mr. J. L. Sherwill's recent list from the Naga Hills. In Burma it has been taken at Toungu in Pegu. Mr. Limborg (P. Z. S. 1878, 822) "obtained it in Upper Tenasserim between Moulmain and Meetan, in the cold weather." Capt. Bingham "took it in the Thoungyeen forests in the Tenasserim interior, in the spring months (Butt. Ind. i. 43) and also in December." In Lower Tenasserim Messrs. Elwes and De Nicéville (J. A. S. Beng. 1887, 415) record it in their Tavoy list, as being "taken at Ponseikai." Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 30) obtained it at "Mergui in December."

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant (Rhop. Malayana, 14) records it from Province Wellesley, Malacca and Perak; Penang; Singapore.

CADUGA TYTIA (Plate 15, fig. 1, 1a, b, c, ♂ ♀).

Euplea Tytia, Gray, Lepidopterous Insects of Nepal, p. 9, pl. 9, fig. 2, ♂ (1833-46).

Danaïs Tytia, Doubleday, List of Lep. in British Museum, i. p. 50 (1844); Doubleday and Hewitson, Diurn. Lep. p. 93, pl. 12, fig. 4 (1847). Standinger, Exot. Schmett. p. 49, pl. 25 (1885). Distant, Rhop. Malayana, p. 408, pl. 41, fig. 15, ♂ (1886). Elwes, Trans. Ent. Soc. Lond. 1888, p. 299.

Caduga Tytia, Moore, Proc. Zool. Soc. Lond. 1882, p. 235 : *id.* 1883, p. 249.

Danaïs (Chittira) Tytia, Marshall and De Nicéville, Butt. of India, &c., i. p. 42 (1882).

Danaïs Sita, Kollar, in Hügel's Kaschmir, iv. p. 424, pl. 6, ♂ (1844).

IMAGO.—Male. Upperside : *Forewing* dark black; with greyish-white semi-hyaline cell interspace, three small narrow spots on the costa before the apex, two subapical elongated streaks, a lower conical spot below outer end of the latter, four

large quadrate discal spots—which, in some rare instances, each pair are partially and sometimes entirely coalesced, a broad elongated interspace below the cell, a narrow basal streak below the submedian vein, a submarginal regular series of seven small rounded spots, and a marginal lower series of smaller spots disposed in pairs between the veins. *Hindwing* dark chestnut red, the veins being blackish at the base, and sometimes at their end; with bluish-white semihyaline cell-interspace which is traversed by a more or less defined red bifid line; a short narrow subcostal streak, short discal spots, narrow inner marginal streaks, two, or three small submarginal spots below the apex, and faint traces of lower submarginal and a marginal series of smaller spots. *Male with two brownish black spatular-shaped patches of scent-scales* near anal angle, the largest being on the submedian, the other on the internal vein, both near their end, each vein being dilated in crossing the patch, a similar shaped brown-black adjacent patch also disposed on each side of the lower median vein, but not accompanied with the corresponding dilatation. Underside marked as above; the apex of forewing being more or less red; the hindwing brighter red, with the submarginal and marginal row of spots well defined; areas of the sexual marks jet-black, and from which project numerous pure white raised scales and longer slender white filaments. *Head*, thorax, and legs black, with white spots, a dorsal streak; edges of tegula, palpi in front and at the side, and femora beneath, white; abdomen red, with white segmental bands beneath.

Female similar to male, except that the submarginal and marginal spots on the upperside of the hindwing are more apparent, and the sexual marks absent.

Expanse, $3\frac{1}{4}$ to $4\frac{1}{2}$ inches.

HABITAT.—Himalayas, Assam, Upper and Lower Burma.

HABITS OF IMAGO.—According to Col. Lang's observations in the N.-W. Himalayas, this is "a forest-loving butterfly, affecting wooded glens at high altitudes, its flight being high and soaring." Mr. A. G. Young records it (Butt. Ind. i. 43) as "strong on the wing, and a fair flier, affecting the long pendant flowers of the hill toon (*Cedrela serrata*), in Kulu; and having there four broods, the first appearing in April at the lower altitudes, the second in June at about 6000 feet elevation, the third brood in August and the first week in September, and the fourth, which is the smallest in numbers, appearing late in October." In the Kangra Valley, the Rev. J. H. Hocking records it (P. Z. S. 1882, 235) to be "double-brooded—March and July; flying up to about 50 feet from the ground, and sailing along motionless, then sweeping down, but not very rapidly."

DISTRIBUTION WITHIN INDIAN AREA.—Found throughout the Himalayas from Kashmir to Sikkim and Bhotan. Capt. R. B. Reed obtained it in Kashmir, and found it very common in 1872 at Kasauli, and also at Subathu. At Simla and Masuri, Capt. Hellard obtained it "in July, August, and September, and at Pangi,

in Busahir, at about 10,000 feet elevation, in August." Col. A. M. Lang records it from the Simla District (P. Z. S. 1865, 494) as occurring "in wooded glen at 6000 to 6700 feet elevation, its flight being high and soaring." Mr. De Nicéville (Butt. Ind. i. 41), "who has carefully explored the Hills about Simla, only found this species on the wing once, in a wooded glen near Theog, on the Hindustan and Thibet road; and though it is said actually to swarm in the Simla Hills in some years, it has not done so to his knowledge since 1876." According to Mr. A. G. Young (Butt. Ind. i. 41), "it is not uncommon in Kulu, where it has four broods, the first brood appearing in April at the lower altitudes, the second brood appears in June at about 6000 feet elevation, a third brood in August and the first week in September, and the fourth, which is much the smallest in numbers, appears late in October." In the Kangra Valley, the Rev. J. H. Hocking took it in March and July (P. Z. S. 1882, 235). In Kumaon, Mr. E. T. Atkinson (Butt. Ind. i. 34) says "it is common about Naini Tal and Almora from September to November;" and Mr. W. Doherty (J. A. S. Beng. 1886, 113) obtained it in the Pindari, Gori, Sarpu, and Kali Valleys, 3000 to 6000 feet elevation." The type specimen figured by Gray is recorded from Nepal. In Sikkim, according to Mr. J. H. Elwes (Tr. Ent. Soc. 1888, 299) it "occurs from the lowest valleys up to 8—9000 feet, but is most abundant at 2—3000 feet, between March and December." In the Runjit Valley, 1200 to 3500 feet, it has been taken in June. It is also recorded from Bhotan, and occurs in Assam. "In the Khasia Hills, it is found in the autumn" (Butt. Ind. i. 43). Mr. J. L. Sherwill obtained it in the Naga Hills. In Burma, "it is common in the hilly districts during the cold weather" (Butt. Ind. i. 43). Mr. Limborg (P. Z. S. 1878, 822) obtained it in "Upper Tenasserim at 4500 feet." It has been taken at Tavoy in Lower Tenasserim (J. A. S. Beng. 1887, 415), and Capt. C. H. E. Adamson remarks (Proc. A. S. Beng. Nov. 1882) that "in Tenasserim it is comparatively rare." "It has also been found in Western Yunnan" (Butt. Ind. i. 43); this latter locality, however, requires confirmation.

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant (Rhop. Malayana, p. 408) records the capture at Perak, in the Malay Peninsula, of specimens which he refers to this species. The male Perak specimens which I have examined have the forewing blacker, the upper discal spots much smaller, the two subapical elongated streaks half the length of those in typical *C. tytia*, and the submarginal spots smaller; the hindwing is much darker chestnut-red (as deep as in *C. nipponica*), all the discal spots extremely small and short, the inner marginal streaks short; and there is no bifid line within the cell, which is always present on this wing in *C. tytia*.

In Messrs. Goodman & Salvin's collection is a specimen labelled "Java," which is identical with Himalayan examples. This latter locality, however, requires confirmation.

INDO-MALAYAN ALLIED SPECIES OF CADUGA.—*C. Nipponica* (Moore, P. Z. S., 1883, 249); nearest to *C. tytia*; with red hindwings. *Habitat.* Japan (? Askold, Chekiang, N. China, N. Formosa).—*C. Loochooana* (Moore, *id.* 250); near to *C. tytia*; duller coloured than the Japanese or Formosan form; hindwings paler, but of a brighter tone of red colour. *Habitat.* Loo Choo Islands.—*C. Swinhoei* (Moore, *id.* 250); near to *C. melaneus*; shorter and with comparatively more regularly triangular forewing and shorter hindwing. *Habitat.* N. Formosa.—*C. pseudomelaneus* (Moore, *id.* 250); an intermediate form between *C. melaneus* and *C. Larissa*, but quite distinct from both; distinguishable by the comparatively narrower forewings and which are conspicuously more produced at the apex, the broad streak below the cell being traversed by a slender black line and the discoidal streak on the hindwing also traversed by a black bifid line. This is the Javan representative of *C. melaneus* and is described by Zinken-Sommer (Nov. Acta Acad. C. Nat. 1831, 179) as that species. Mr. Snellen, of Rotterdam, informs me that this “is a local Javan species and found only on the mountains.” *Habitat.* Java.—*C. Larissa* (Felder, Reise, Nov. Lep. ii. 349); nearly one-fourth less in size than in *C. pseudomelaneus*, with more regularly triangular form of forewing. *Habitat.* Java (? also N. Borneo).—*C. Banskii* (Moore, *l.c.* 251); nearest to *C. Larissa*, but larger in expanse and quite distinct from *C. melaneus*. *Habitat.* Sumatra.—*C. funeralis* (Butler, Ann. N. H. 1884, 58); nearest to *C. Banskii*. *Habitat.* Island of Nias.—*C. Luzonensis* (Felder—figured in Semper’s Reisen Arch. Philippen, p. 13, pl. 2, fig. 8, 9, ♂ ♀); distinguishable by the broad markings, the oblique sub-apical series being shorter, the streak below the cell with broad black traversing line; hindwing cell streak absent. *Habitat.* Philippines.—Following after these is the single known species of the allied genus *Mangalisa*, namely, *M. Albata* (Zinken-Sommer, *l.c.* 191, pl. 16, fig. 16). *Habitat.* Java.

BUTTERFLY MIMICKS OF SPECIES OF CADUGA.—In Nepal and Sikkim *Caduga tytia* is mimicked by the Papilionid group of butterflies *Cadugoides*, viz., *C. agestor*, both sexes of which resemble it in a most remarkable manner, in having the same form and coloration of the front and hindwings, and similarly shaped and coloured markings. In the N. W. Himalayas *C. tytia* is also mimicked by the two allied species of *Cadugoides*, namely *C. Govindra* and *C. Gopala*. In the Eastern Himalayas, again, it is mimicked by one of the species of the allied Papilionid butterflies *Paranticopsis*, namely, *P. Xenocles*. Besides these mimetic Papilionids, *C. tytia* is also mimicked in Cashmere, Nepal, Sikkim, and throughout its range of habitat, by a species of the Nymphalid genus *Hestina*, namely, *H. Nama*, by both its sexes, the females of which have the hindwings of the brightest tone of coloration. *Badacara Nilgiriensis*, in South India, is mimicked by a species of the Pierid genus *Nepheronia*, namely, by the females of *N. pingusa*.

Genus BADACARA.

Forewing shorter and comparatively broader, and more regularly triangular in form than in *Caduga*; cell shorter; discocellulars acutely bent in the middle. *Hindwing* also shorter and broader, and more triangular in shape, the outer margin conspicuously more oblique; cell shorter. *Male* with a small spatular-shaped patch of scent-scales on the submedian and internal vein with accompanying dilatation of each vein, and a much larger contiguous patch on the upper side of the lower median vein, but which is not traversed by a dilatation of the vein.

Type.—*B. Nilgiriensis*.

This genus is confined to a single known species, and is a shorter and somewhat broader insect than *Caduga*, with more regularly triangular form of both wings, which have a peculiar pattern of markings assimilating more to those in *Parantica*.

BADACARA NILGIRIENSIS (Plate 16, fig. 1, 1 a, b, ♂ ♀).

Danaïs Nilgiriensis, Moore, Ann. and Mag. Nat. Hist. 1877, p. 44.

Danaïs (Chittira) Nilgiriensis, Marshall and De Nicéville, Butt. of Ind., &c., p. 43, pl. 6, fig. 9, ♂ (1882).

Caduga Nilgiriensis, Moore, Proc. Zool. Soc. Lond. 1883, p. 251; Hampson, Journ. Asiat. Soc. Beng. 1888, p. 347.

IMAGO.—Upperside fuliginous black. *Forewing* with a very bluish-white cell-streak divided into three separate very slender portions, the two upper portions of which are more or less obsolescent, especially in the male; three costal spots before the apex, below which are two narrow streaks, the lower elongated; the usual five small discal spots, two elongated narrow terminally-joined streaks between the lower median and submedian veins, and a very slender basal streak below the submedian vein; a submarginal series of seven small rounded spots, and an incomplete marginal row of small dots. *Hindwing* with a bluish-white narrow fusiform streak within the cell; five contiguous small discal spots, four long slender abdominal streaks, a submarginal series of small spots, the two upper of which are the largest, the third being dentate, the others small; a marginal row of small dots. *Head*, thorax, and legs black, front and side of palpi and dorsal streaks on thorax and femora beneath white; head, thorax in front and beneath spotted with white; abdomen fuliginous-black above, greyish beneath with white segmental bands. *Male* with spatular-shaped patches of scent-scales blackish, disposed as in *C. tytia* and *C. melaneus*. Underside fuliginous-brown; markings as above, but more defined; the discal area of forewing broadly blackish, and the hindwing clouded with dark brown across the discal area between the veins.

Expanse, $2\frac{2}{3}$ to $3\frac{1}{2}$ inches.

HABITAT.—S. India (Malabar and Travancore Hills).

DISTRIBUTION.—This is a local but well-marked species, peculiar to the hills in the south of the peninsula. It is common at Coonoor in July, and, according to Mr. G. F. Hampson (J. A. S. Beng. 1888, 347) is also “common throughout the Nilgiris.” General Evezard sent me specimens from the Shevaroy Hills. Mr. Harold Fergusson records it (Butt. Ind. i. 44) as “not common in the winter in Travancore; it occurs on the hills (Annumali and Ashambo) from 2000 feet upwards; throughout February it is tolerably common; in April and May it was fairly common above 3000 feet, and some specimens have been taken in June.” It also has been taken in Tinnevely.

Genus CHITTIRA.

Chittira, Moore, Lepidoptera of Ceylon, i. p. 8 (1880); *id.* Proc. Zool. Soc. Lond. 1883, p. 251.

Danaïs (*Chittira*, Sect. B, part), Marshall and De Nicéville, Butt. of India, &c., I. p. 42 (1882).

IMAGO.—*Forewing* somewhat short and broad; costa much arched, hind margin long; discocellulars bent in the middle below the lower radial, and producing a short spur within the cell from the angle. *Hindwing* broadly oval, very convex exteriorly. *Male* with two spatular-shaped patches of scent-scales, one on the submedian vein, the other which is the smallest, on the internal vein, and with less apparent spatular patch, both traversed by a dilatation of the vein. *Antennæ* with a tolerably thick club. *Palpi* large, third joint pointed, very pilose above and beneath.

This genus is confined to a single species, found only in the Island of Ceylon, where it is found chiefly in the hilly forests.

PECULIAR CHARACTERISTICS OF THE GENUS.—It is a noticeable feature in *Chittira fumata* that the underside of the wings have a similarity of the ground colours to those prevailing in certain species of the group *Euploeina*—species, too, which do not belong to the Indian fauna—namely, *Pramasa mitra*, which is found only in the Seychelle Islands, and in a somewhat lesser degree, *Vonona Euphon*, of the Mauritius; the former species (*Pramasa mitra*) especially having a similarly disposed shade of intensified colour crossing the discal area of the hindwing, which peculiarity is present, so far as I have observed, only in one other species of *Limnaina*—namely, *Badacara Nilgiriensis*. Moreover, the white markings in *Chittira* are peculiarly its own—the abnormally short cell-streak, the short subapical streaks, and the presence, or more frequently obsolescence, of only a single very small discal spot between the middle and upper median veinlets, the latter as generally prevailing on the forewing of the *scent-pouch bearing* genus *Salatura*. It may, therefore, be reasonably presumed that *Chittira* (and probably also *Badacara*) is an Eastern member of the characteristic but numerically very restricted and doubtless ancient forms of this subfamily of butterflies, which are confined to the granite-formed islands of the Seychelle Archipelago, Mauritius, Bourbon, &c. The forms are *Berethis phadon* of the group *Limnaina*, and *Vonona Euphon*, *V. Goudotii*, *V. Desjardinsi*, and *Pramasa mitra*, of the

group Euplœina. The genus *Chittira* is entirely distinct from *Badacara* (*B. Nilgiriensis*), with which Mr. De Nicéville groups it (Butt. Ind. i. p. 42)—the latter butterfly, besides having a conspicuously more triangular form of both wings, the male possesses the large spatular-shaped patch of scales on the lower median veinlet, *in addition* to that on the submedian and on the internal vein, the former patch not being present in *Chittira*.

CHITTIRA FUMATA (Plate 16, fig. 2, 2 a, b, ♂ ♀).

Danaïs fumata, Butler, Proc. Zool. Soc. Lond. 1886, p. 53.

Chittira fumata, Moore, Lep. of Ceylon, i. p. 9, pl. 4, fig. 1, 1a, ♂ ♀ (1880); *id.* Proc. Zool. Soc. 1883, p. 252.

Danaïs taprobana, Felder, Reise Novara, Lep. ii. p. 349, pl. 42, f. 4 (1867).

Danaïs (*Chittira*) *taprobana*, Marshall and De Nicéville, Butt. of India, &c., i. p. 44 (1882).

IMAGO.—Male and female. Upperside rich dark brown, slightly paler on the abdominal margin. *Forewing* with a somewhat opaque pale greyish-white short and narrow streak within the cell; a more or less defined broad lengthened triangular streak below the cell, the streak being basally traversed by a broad brown line; three small discal spots above it, the upper one being minute or obsolete; a subapical oblique series of five spots, the third and fourth being elongated; and a submarginal row of six small spots. *Hindwing* with a broad greyish-white discoidal streak, a small narrow discal streak above its end, and one or two minute spots beyond it, a submarginal apical series of three or four very small spots, the lower spots being obsolescent in the male, but more apparent in the female, the female also having a lower marginal row of minute spots. *Male with two spatular-shaped patches of scent-scales*, one on the submedian vein, the other which is the smallest and with a less apparent patch on the internal vein, both traversed by a dilatation of the vein. *Cilia* alternate brown and white. *Head*, thorax, palpi, and legs black; thorax in front and beneath and head white spotted, front and side of palpi and femora beneath white; abdomen dark brown above, beneath paler, with grey segmental bands. Underside paler, but of a brighter brown colour; markings as above; hindwing clouded with darker brown between the veins across the discal area, the exterior border being grey speckled.

Expanse, $2\frac{3}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—Ceylon.

DISTRIBUTION AND HABITS.—Confined to the Island of Ceylon, and according to Mr. Hutchison it is “found all the year, but scarce in February and March, in the hills 3000 to 6000 feet, in forest and often in coffee plantations. Common at New-era Eliya and several miles around. Flight slow and heavy.” Mr. F. M. Mackwood also notes its occurrence “in the middle and upper elevations, where it is very common.”

GROUP EUPLEINA.

Eupleina, Moore, Proc. Zool. Soc. Lond. 1883, p. 253.

IMAGO.—Males, in addition to the abdomen being furnished with odoriferous extensible anal tufts of hairs, most genera possess, on the upperside of the forewing, either one, or two, longitudinal lustreless patches of scent-producing scales or “androconia,” or with such a patch of scales absent or present on the forewing, and also an enlarged patch on the anterior border of the hindwing. No precostal cell in hindwing. Claws with paronychial and pulvilli.

ADULT CATERPILLAR with four pairs of subdorsal long slender fleshy processes.

HISTORICAL NOTE.—The group *Eupleina* has been greatly increased by collectors of late years, and now comprises a large number of species, the arrangement of which, under the old genus “*Eupleia*,” is still persistently adhered to by certain entomologists. Hübner, in 1816 (Verz. p. 16), was the first to study the then known species of this group, dividing them into three genera—*Trepsichrois*, *Crastia*, and *Salpinx*. The next authors who took up the group, Doubleday and Hewitson, in their great work, “The Genera of Diurnal Lepidoptera,” published in 1847, enumerate thirty-seven species of this group under the one generic name of “*Eupleia*,” arranging them in succession, mostly according to the presence of the sexual mark on the wings of the male. In 1878, Mr. Butler published his Memoir on “the Butterflies referred to the Genus *Eupleia*” in the Journ. Linn. Soc. Zool. xiv. pp. 290—303, in which the then known species are arranged under seven genera, the sexual mark in the male insect being taken—for the first time—as a structural character for their separation. This character was taken as the basis for the genera in my “Lepidoptera of Ceylon” in 1880, and was also adopted for unnamed sections of the one genus—*Eupleia*—by Mr. Distant, in his “*Rhopalocera Malayana*,” in 1882. Messrs. Marshall and De Nicéville, in “Butterflies of India,” 1882, divided the genus *Eupleia* into seven groups, as defined by Mr. Butler, using the names, however, only as designations for the various groups, and arranging the whole of the species under *Eupleia*. In the following year, 1883, my “Monograph” of this group was published in the “Proceedings of the Zoological Society of London,” in which the sexual mark was taken as the primary character for separation of the species into various characteristically defined genera. These genera, as therein described, are adopted in the present work.

GENERAL CHARACTERISTICS.—The species of this group of butterflies are usually of a dark brown or blackish colour, sometimes more or less olivaceous, generally with a velvety appearance, and some with purple-violet reflections or brilliantly glossed with steel-blue, especially on the forewing; they are more or less spotted with white or violet, the hindwing in some streaked with white, the spots generally

being arranged in a double marginal series on both wings, in some there is a third or discal row, but these markings are variously developed, and in many species some or most of them are entirely absent. The head and thorax are white spotted. In the male the posterior margin of the forewing is usually more or less convex, the rounded outline often covering a large portion of the hindwing even when the wings are extended. *Males in most sections with one, or two, impressed streaks or sexual marks*—"androconia," as they are now termed—situated between the lower median veinlet and the submedian, clothed with scent-producing scales, which are differently formed from those on the rest of the wing, together with an androconial paler patch, present in some sections on the anterior portion of the upperside of the hindwing and covered by the convex border of the forewing. When first looked at under the 'binocular,' these sexual marks, when present on the upperside of the forewing, appear, in all our genera except *Danisepe* and *Salpinx*, as an elongated glistening jagged series of reticulations, as if they were formed of dried excretory matter; but on steady concentration, this illusory effect disappears, and the scales stand out clearly defined, the previous jagged reticulated appearance arising from the membrane beneath showing between the irregular outlines of the layers of scales. Females with the posterior margin of the forewing usually straight, or but very slightly convex towards the base.

"In some few species," as stated by the authors of Butt. of India, p. 37, "the sexes differ materially in the colour of the hindwing, the males having this wing nearly uniform dark brown, and the females having it streaked with white, but as a rule the differences in colour and markings are slight, and the sexes are only to be distinguished by their structure and outline, and by the presence or absence of the sexual marks on the wings."

Key to the Indian Genera of EUPLEINÆ, based on the presence and position of the sexual mark.

- A. *No sexual mark* or patch of scent-producing scales on forewing, in male.
 - a. Exterior margin of forewing even, posterior margin of forewing very convex MENAMA.
 - b. Exterior margin of forewing uneven, posterior margin of forewing very convex TRONGA.
- B. *One sexual mark* or patch of scent-producing scales on forewing, in male.
 - I. *Sexual mark short, slender.*
 - a. Exterior margin of forewing uneven, posterior margin of forewing almost straight CRASTIA.
 - b. Exterior margin of forewing uneven, posterior margin of forewing convex MAHINTHA.
 - II. *Sexual mark long, slender.*
 - a. Exterior margin of forewing uneven, posterior margin of forewing broadly convex KARADIRA.
 - III. *Sexual mark long, very broad.*
 - a. Exterior margin of forewing convex, posterior margin of forewing convex PENOA.

- C. *No sexual mark on forewing.* Hindwing with a sexual patch, in male.
- I. *Sexual patch on hindwing small.*
- a. Exterior margin of forewing uneven, posterior margin of forewing slightly convex TREPSICHOIS.
- II. *Sexual patch on hindwing moderate.*
- a. Exterior margin of forewing convex, posterior margin of forewing convex. CALLIPLGEA.
- III. *Sexual patch on hindwing large.*
- a. Exterior margin of forewing convex, posterior margin of forewing very convex EUPLAEA.
- D. *One sexual mark on forewing.* Hindwing with a sexual patch, in male.
- I. *Sexual mark on forewing short, broad; patch on hindwing small.*
- a. Exterior margin of forewing convex, posterior margin of forewing slightly convex DANISEPA.
- II. *Sexual mark on forewing short; patch on hindwing large.*
- a. Exterior margin of forewing convex, posterior margin of forewing very convex SALPINK.
- b. Exterior margin of forewing oblique, posterior margin of forewing convex PADEMMA.
- III. *Sexual mark on forewing long; patch on hindwing large.*
- a. Exterior margin of forewing oblique, posterior margin of forewing convex ISAMIA.
- IV. *Sexual mark on forewing slender; patch on hindwing large.*
- a. Exterior margin of forewing oblique, posterior margin of forewing convex TIRUNA.
- E. *Two sexual marks on forewing, in male.*
- a. Sexual marks long, exterior margin of forewing oblique, posterior margin of forewing convex NARMADA.
- b. Sexual marks long, broad, exterior margin of forewing convex, posterior margin of forewing convex STICTOPLAEA.

DIFFICULTY IN DISCRIMINATING THE SPECIES.—The determination of the species of this group of butterflies, until a very recent period, has been a most difficult task. This difficulty was partly owing to the indefiniteness of many of the original descriptions, which were published—mostly without figures—by entomologists having no previous knowledge of the group, and, as has since been shown in the “Mimetic tables” of my “Monograph,” published in the Proc. Zool. Society, London, 1883, pp. 208—12, this difficulty was intensified by an hitherto unrecognized feature in this group, namely the great superficial resemblance of many of the species to one another; species which, since their division into sections, according to the presence of the sexual mark in the male, are now proved to belong to distinct genera, pertaining to different sections of the group.

As a result, and chiefly owing to this mimetic resemblance, numerous instances occurred in most collections in which specimens were incorrectly determined, and, moreover, even where the determination of specimens had been made by actual comparison with correctly-named species, several instances came under my own observation in which a series labelled with a given specific name embraced specimens

of two, and in some cases three, and even four, distinct species, belonging to as many different genera pertaining to other sections of the group.

An example of the resemblance, both in colour and pattern of markings, pervading the species of Euploëina, is given in the following table, which embraces certain species of the various sections occurring only within our area. The sections, as characterized in the "Key" above, are arranged in order of succession, in accordance with the development of the androconial marks.

TABLE SHOWING CERTAIN INDIAN SPECIES OF EUPLOEINÆ, OF ONE SECTION, WHICH RESEMBLE SPECIES OF OTHER GENERA IN THE DIFFERENT SECTIONS.

Section A. No sexual mark on forewing.	Section B. One sexual mark on forewing.	Section C. Sexual mark on hind- wing.	Section D. One sexual mark on forewing, and on hind- wing.	Section E. Two sexual marks on forewing.	Habitat.
<i>Menama modesta</i>	<i>Penoa Limborgii</i>		<i>Isamia margarita</i>	<i>Stictoploea Harrisii</i>	Burma.
<i>Menama simulatrix</i>	<i>Crastia Camorta</i>				Nicobars.
. . . .	<i>Penoa Deione</i>	<i>Trepsichrois Linnæi</i>	<i>Isamia splendens</i>	<i>Stictoploea binotata</i>	N.E. India
. . . .	<i>Crastia Core</i>		<i>Pademmma Kollari</i>	<i>Narmada coreoides</i>	Lower India.
. . . .	<i>Crastia Asela</i>		<i>Pademmma Sinhala</i>	<i>Narmada montana</i>	Ceylon.
<i>Tronga Bremeri</i>	<i>Crastia Godarti</i>		<i>Pademmma crassa</i>		Burma.
. . . .	<i>Mahintha subdita</i>		<i>Pademmma Masoni</i>		Tenasserim.
. . . .	<i>Karadira</i> <i>Andamanensis</i>		<i>Tiruna Roëpstorffii</i>		Andamans.

GEOGRAPHICAL DISTRIBUTION.—This is an Eastern-Asiatic group, being most highly developed in the Malay Archipelago, extending to the extreme eastern islands of the New Hebrides, Fiji, and Samoa, and also to Australia. Four species are known also to occur only on certain islands in the Indian Ocean, namely, one on the Island of Mahe, Seychelles, one on Bourbon and Madagascar, another at Mauritius, and the fourth on Rodriguez. Of those species occurring within the Indian area, *Tronga Nicevillei*, *Crastia Core*, *Trepsichrois Kalinga*, *Pademmma Kollari*, and *Narmada coreoides* are peculiar to the lower part of India, the four latter species being commonly found in the southern portions of the Continent. In the Himalayas and north-east districts are found *Crastia vermiculata*, *Penoa Deione*, *Trepsichrois Linnæi*, *Danisepea Ramsayi*, *Pademmma Klugii*, *P. indigofera*, &c., *Isamia splendens*, *Stictoploea Hopei*, *S. binotata*, and *S. pygmæa*. In Burma, besides those extending upward to N.E. India, are found *Menama Camaralzeman*, *M. modesta*, *Penoa Limborgii*, *Crastia Godarti*, *Mahintha subdita*, *Pademmma Erichsoni*, &c., *Isamia Carpenteri*, and the following species, which occur also in the Malay Peninsula:—*Tronga Bremeri*, *Euploea phæbus*, *Calliploea Ledereri*, *Danisepea Rhadamanthus*, *Salpinx leucogonys*, and *Isamia margarita*. In the Andaman and Nicobar Islands, seven or eight species occur, of which *Menama simulatrix*, *Tronga biseriata*, *Crastia Esperi*, *C.*

Camorta, *Tiruna Roëpstorffii*, and *Karadira Andamanensis* are confined to those islands. In Ceylon the restricted species are *Crastia Scherzeri*, *Crastia Asela*, *Crastia Frauenfeldii*, *Eupleea Corus*, *Pademna Sinhala*, and *Narmada montana*.

GENERAL HABITS.—The authors of "The Butterflies of India" (p. 57) remark that "they affect patches of scrub in cultivation, and the edges of forests, and fly rather slowly and heavily; they are most abundant in warm, damp, tropical climates, and seem to shun dry places, whether cold or hot."

Genus MENAMA.

Eupleea (Crastia, Sect. B), Marshall and De Nicéville, Butt. of India, i. p. 76 (1882).

Menama, Moore, Proc. Zool. Soc. Lond. 1883, p. 264.

IMAGO.—Male. *Forewing* rather long, broad, costal margin slightly arched, apex somewhat acuminate, exterior margin very oblique, short, posterior margin very convex in the middle; upper discocellular bent very obliquely inward, and angled at its lower end, emitting a short discoidal veinlet from the angle, lower bent obliquely outward. On the underside is a large elongated scabrous patch, composed of elongated round-tipt regularly and flatly disposed layers of ribbed scales on the posterior margin. *Hindwing* broad, exterior margin obliquely convex, with a broad glossy anterior border. *Palpi* short, thick, compactly hirsute, apex very short, pointed.

Type.—*M. Camaralzeman*.

MENAMA CAMARALZEMAN (Plate 17, fig. 1, 1a, ♂).

Eupleea Camaralzeman, Butler, Proc. Zool. Soc. Lond. 1886, p. 271, pl. 29, fig. 1, ♂; Druce, P. Z. S. 1874, p. 103.

Crastia Camaralzeman, Butler, Journ. Linn. Soc. Zool. xiv. p. 298 (1878).

Eupleea (Crastia) Camaralzeman, Marshall and De Nicéville, Butt. of India, i. p. 77 (1882); Elwes and De Nicéville, Journ. Asiat. Soc. Bengal, 1887, p. 416.

Menama Camaralzeman, Moore, Proc. Zool. Soc. Lond. 1883, p. 264.

IMAGO.—Male. Upperside blackish-brown, outer borders paler, the basal area of both wings glossed with steel-blue. *Forewing* with an indistinct white discal dot between the upper and middle median veinlets, and two or three very small white lower-marginal spots. *Hindwing* with the costal border broadly pale glossy cinerous-brown; a submarginal row of small oval prominent white spots, and a marginal row of more rounded spots, both rows somewhat decreasing in size towards the apex. Underside dark olivaceous-brown. *Forewing* with a small white costal spot above end of the cell, one at lower end of the cell, one on the disc between upper and middle median veinlets, also a larger oval spot between the middle and

lower medians, and two or three small lower-marginal spots; posterior border broadly cinerous-brown, with a broad ochreous patch above inner end of submedian, composed of elongated round-tipt regularly and flatly disposed layers of ribbed scales. *Hindwing* with a submarginal and marginal row of white spots as on upperside, a very small white spot within end of the cell, and a minute discal series outside the cell. *Body* dark brown; thorax in front and beneath, head, palpi, and legs black, spotted with white; abdomen beneath with white segmental bands and lateral spots. Female unknown.

Expanse, ♂ 4 to $4\frac{1}{4}$ inches.

HABITAT.—? Lower Burma, Siam.

DISTRIBUTION.—The type specimen in the British Museum collection is recorded from Siam. Mr. E. L. Layard (P. Z. S. 1874, 103) obtained it at "Chentaboon and Nahconchaisee" on the coast of the Gulf of Siam. Messrs. Elwes and De Nicéville (Journ. As. Soc. Beng. 1887, 416) record a specimen from Tavoy, which they doubtfully refer to this species.

MENAMA MODESTA (Plate 17, fig. 2, 2 a, b, ♂ ♀).

Eupleia modesta, Butler, Proc. Zool. Soc. Lond. 1866, p. 273, ♂. Druce, P. Z. S. 1874, p. 103.

Crastia modesta, Butler, Journ. Linn. Soc. Zool. xiv. p. 298 (1878).

Eupleia (Crastia) modesta et cupreipennis, Marshall and De Nicéville, Butt. of India, i. p. 77 (1882).

Crastia cupreipennis, Moore, Proc. Zool. Soc. Lond. 1878, p. 823, ♂.

Menama Tavoyana, Moore, Proc. Zool. Soc. Lond. 1883, p. 265, pl. 30, fig. 6, ♂.

Eupleia (Menama) Tavoyana, Elwes and De Nicéville, Journ. Asiat. Soc. Bengal, 1887, p. 416.

IMAGO.—Male, upperside dark purplish-brown, some specimens of a more rufescent tint, others again somewhat olivaceous-brown. *Forewing* darkest and glossed more or less with steel-blue from the base to near the outer margin, the blue gloss appearing in certain lights on one side only (the blue extending variously to within one-third or one-sixth of the outer margin), the other wing then having a blackish glossless tint; a white dot sometimes present on the costa above end of the cell, one within end of the cell, one or two on the disc between the upper and lower median veinlets, one or two also before the apex, two or three lower submarginal, and one or two lower marginal pairs. *Hindwing* slightly blue-glossed towards the base; with a submarginal row of prominent small white oval anteriorly-decreasing spots, and a marginal row of smaller spots; costal border broadly glossy cinereous, with an upper discoidal greyish-brown patch which is clothed with very densely-packed laxly-raised narrow round-tipt scales. Underside olivaceous-brown. *Forewing* with the small outer spots as above, when present, more prominent and bluish-white, the costal spot, the one at end of the cell and two or three somewhat larger discal spots always being present; a grey-brown streak between the median

and submedian vein, which, as seen under the "binocular," is clothed with brown and whitish scales, the brown scales being of the same size and the ordinary scoop-shape, and the white scales of half their width, and interspersed between the layers are a few projecting longer thread-like white scales, and a contiguous lower elongated patch which is creamy-white along its upper portion and iridescent grey along the extreme posterior border. *Hindwing* with the submarginal and marginal white spots as above, a small bluish-white spot within end of the cell, and a sometimes complete discal series of small spots; some white dots also at base of the wing. FEMALE differs on the forewing only in having the posterior margin straight, and on the hindwing in the somewhat larger submarginal and marginal spots. Underside with the streak between the median and submedian, and the discal spots bluish-white. *Body* dark brown; thorax in front and beneath, head, palpi, and legs black, spotted with white.

Expanse, ♂ ♀ 3 to 3½ inches.

HABITAT.—Lower Burma, Siam.

DISTRIBUTION.—Obtained by Mr. O. Limborg at "Hatseiga, Hounduran source, Upper Tenasserim, in December" (P. Z. S. 1878, 823). Several specimens were also taken by Capt. C. T. Bingham in the forests of the Thoungyeen Valley, Donat Range, in March. It also occurs in Tavoy, and Dr. J. Anderson obtained it in the "Mergui Archipelago from November to December" (J. Linn. Soc. Zool. 1886, 30). The type specimen was from Siam, and it has also been obtained by Mr. E. L. Layard near Bangkok, and at Chentaboon, a mountainous and wooded district 200 miles from Bangkok on the coast of the Gulf (P. Z. S. 1874, 103). Specimens of this species are in the collection of the British Museum from Salanga, a small island off the Malay Peninsula.

MENAMA SIMULATRIX (Plate 18, fig. 1, 1a, b, c, ♂ ♀).

Eupleea (Crastia) simulatrix, Wood-Mason and De Nicéville, Journ. Asiat. Soc. Beng. 1881, p. 229,

♂; *id.* 1882, p. 15, pl. 3, fig. 1, 2, ♂ ♀. Marshall and De Nicéville, Butt. of India, i. p. 76 (1882).

Vadebra simulatrix, Moore, P. Z. S. 1883, p. 261.

IMAGO.—Male. Upperside very dark purplish-brown, suffused with a violaceous-blue gloss in some lights, the external borders being broadly paler and unglossed. *Forewing*, in some specimens, with a minute white subapical spot situated between the lower subcostal and the upper radial. *Hindwing* with a large broad upper discoidal patch of paler brown, clothed with densely packed laxly-raised narrow round-tipt scales, the costal border in front being cinereous and also slightly iridescent. Underside somewhat paler, and of a violet-brown, the dark basal area violet-glossed in some lights, the pale outer borders broader. *Forewing* with an obliquely-disposed subapical series of three minute bluish-white spots, a small spot

on the costa above end of the cell, a larger sometimes indentate spot within end of the cell, three discal spots outside the cell, the upper one being very slender, and an elongated creamy-white streak extending between the lower median and submedian vein, below which is a continuous similar coloured broader streak, both streaks being clothed with very numerous well-separated slightly raised narrow round-tipt scales, and with regularly alternating very narrow scales, and a few thread-like scales, the extreme posterior border being glossy cinereous. *Hindwing* with a small bluish-white cell spot, a curved discal series of six smaller spots, the upper one being slender and sometimes obsolete, three or four minute basal white spots, and an obsolescent marginal row of minute spots.

FEMALE. Upside lighter coloured, the outer borders more broadly paler brown. *Forewing* with three more or less obsolescent small white subapical spots, an oval costal spot above end of the cell, a minute dot within end of the cell, and a small spot beyond between the upper and middle medians. *Hindwing* with the costal border brownish-white, and a small whitish spot between the subcostals. Underside with similarly disposed spots on both wings as in male, the subapical spots more prominent, the discal spots somewhat larger, and the marginal series on the hindwing incomplete and less distinct; on the forewing the creamy-white streak is narrower and the posterior border paler. *Body* dark brown; thorax in front and beneath, head, palpi, and legs black, white spotted; abdomen beneath with white segmental bands.

Expanse, ♂ $3\frac{1}{4}$ to $3\frac{1}{2}$, ♀ $3\frac{1}{2}$ inches.

HABITAT.—Great Nicobar, Car Nicobar; Pulo Kondul.

The similarity of this species to *Crastia Camorta*, its Nicobarian ally, is very striking. The males of the latter species may, however, be readily distinguished from it by the presence of the well-defined sexual mark between the lower median and submedian vein on the forewing, this wing also having the posterior margin more broadly convex. The colour of the male *C. Camorta* is also less purpurescent above and below, and in the female the colour is cinnamomeous-brown with distinctly paler and broader outer borders.

Though this species does not well fit into the genus *Menama*, it is certainly not a *Vadebra*, in which it had been placed in my monograph (l.c. p. 261) previous to having seen specimens. It differs from the other species of *Menama* in the absence of the characteristic blue gloss on the forewings and the two marginal rows of whitish spots on the hindwings.

INDO-MALAYAN ALLIED SPECIES OF MENAMA.—*M. Buxtoni* (Moore, P. Z. S. 1883, 265); with violet-brown forewing washed with violet-blue. *Habitat.* Sumatra. *M. Mouhoti* (Moore, *id.* 265, pl. 31, fig. 6, ♂); ochreous brown; forewing slightly tinged with olivaceous. *Habitat.* Cambodia.—*M. Lorza* (*M. id.* 265, pl. 31, fig. 5, ♂);

violet-brown; forewing basally glossed with violet-blue, and with a submarginal upper series of small white spots before the apex. *Habitat.* Sandakan, North Borneo.

Genus TRONGA.

Euplaea (Sect. A. part), Distant, Rhop. Malayana, p. 22 (1882).

Euplaea (Group 5, Sect. C. part), Marshall and De Nicéville, Butt. of India, i. p. 76 (1882).

Tronga, Moore, Proc. Zool. Soc. Lond. 1883, p. 266.

IMAGO.—Male. *Forewing* broad, elongate, exterior margin short, oblique and slightly uneven; posterior margin very broadly convex, and thus giving this wing a somewhat quadrate form; cell long, upper discocellular with a short spur or discoidal veinlet emitted within the cell. No sexual mark on the upperside. On the underside is a broad greyish-brown patch between the lower median and submedian vein, clothed with somewhat narrow round-tipt scales (smaller than the normal adjacent scales), with numerous intervening very narrow scales, and a few very slender projecting scales. *Hindwing* short, apex and exterior margin very convex; cell broad across the middle, with a large, slightly defined broad spatular patch of slightly adpressed ordinary shaped scales extending through the upper end of the cell along both sides of the subcostal to the disc. Palpi small, short, compactly hirsute, apex short, pointed.

Type.—T. Crameri.

TRONGA BREMERI (Plate 19, fig. 1, 1a, b, c, d, ♂ ♀).

Euplaea Bremeri, Felder, Wien. Entom. Monats. iv. p. 398, ♂ (1860). Butler, Trans. Linn. Soc. Zool. 1879, p. 535. Distant, Rhop. Malayana, p. 23, pl. 2, fig. 4, ♂ (1882).

Crastia Bremeri, Butler, Journ. Linn. Soc. Zool. xiv. p. 298 (1878).

Euplaea (Crastia) Bremeri, Marshall and De Nicéville, Butt. of India, i. p. 78 (1882).

Tronga Bremeri, Moore, Proc. Zool. Soc. Lond. 1883, p. 267, pl. 29, fig. 5, ♂; *id.* Journ. Linn. Soc. Zool. 1886, p. 30.

Tronga Olivacea, Moore, Proc. Zool. Soc. Lond. 1883, p. 267, ♀ (small var.).

IMAGO.—Male. Upperside olivaceous-brown, of a more or less dark tint. *Forewing* with a submarginal series of prominent white oval spots, the three upper of which are slender and curve inward to the costa, the next below being much larger and elongated, the other five decreasing in size, the lowest being either minute or obsolete; a more or less complete marginal row of very small spots; a very small spot also on the costa above end of the cell, another within lower end of the cell, one on the disc between the upper and middle median,—another between the middle and lower median veinlets, and sometimes a slender spot also between the upper median and radial. *Hindwing* with the costal border broadly cinerous and glossy, covered with widely disposed small narrow round-tipt scales; a submarginal and marginal series of small white spots, the former series sometimes being posteriorly

incomplete. Underside paler olive-brown; submarginal and marginal series and other white spots as on upperside, but more prominent. *Forewing* also having a more or less complete series of discal spots, the lowest one of which being as large as the lower submarginal spot, the upper three, and sometimes four, of considerably less size; an elongated broad streak clothed with somewhat narrow round-tipt brown scales, with numerous white very narrow interspersed scales, and a few very slender white scales between the lower median and submedian vein, the posterior border below being glossy-cinereous, covered with widely separated very narrow round-tipt scales along extreme edge, and some laxly raised lance-pointed scales along the submedian. *Hindwing* also with a discal series of five small white spots, and one within end of the cell; some small white spots also at base of the wing. *Body* dark brown; thorax in front and beneath, head, palpi, and legs black, spotted and streaked with white; abdomen beneath with white segmental bands. FEMALE. Upperside paler olive-brown. *Forewing* with submarginal, marginal, and other white spots as in male, but somewhat larger; also with a discal series, varying from two to five, of upward decreasing spots; a white streak also between the median and submedian vein, the posterior border being cinerous. *Hindwing* as in male. Underside of the same tint as the upperside, and with similar markings; the hindwing also having a discal series of small spots, and one within end of the cell.

Expanse, $2\frac{3}{4}$ to $3\frac{3}{4}$ inches.

HABITAT.—Lower Burma; Malay Peninsula.

DISTRIBUTION WITHIN INDIAN AREA.—The northernmost limit recorded is Akyab, where it was taken in July by Capt. C. H. E. Adamson (Proc. As. Soc. Beng. Nov. 1882). Capt. C. T. Bingham also obtained it in the Thoungyeen forests in Upper Tenasserim; and Dr. J. Anderson (Journ. Linn. Soc. Zool. 1886, 80) took numerous specimens in the Mergui Archipelago from December to March. Its occurrence outside our area is restricted to the Malay Peninsula.

TRONGA NICEVILLEI (Plate 20, fig. 1, 1a, b, c, ♂ ♀).

IMAGO.—Male. Upperside very dark olivaceous-brown. *Forewing* with a submarginal series of nine pure white spots, of which the two lowest are rounded, the third and fourth the smallest, the fifth and sixth the largest and the latter elongated, the three upper being narrow and curving inward to the costa; a marginal row of small spots disposed in pairs between the veins except the subcostals; a white dot also on the costa above end of the cell, and another on the disc between the upper and middle median veinlets. *Hindwing* broadly cinereous along the costal border; with a submarginal row of large pure white spots, of which the lower are oval and the upper three somewhat cordate; a marginal row of small conical spots, the three lower spots of both rows coalescing, and the second and

third anterior pair of each row slightly touching one another. Underside pale olivaceous-brown. Both wings with the submarginal and marginal spots as above. *Forewing* also with a very small violet-white costal spot, one within lower end of the cell, two spots on the disc between the median veinlets, the lower spot large; a cinereous-brown elongated streak between the lower median and submedian vein, below which the posterior margin is broadly cinereous. *Hindwing* also with a violet-white dot within end of the cell, and a discal series of six dots; some white dots at base of the wing. FEMALE. Upperside paler than in male. Both wings with slightly larger submarginal and marginal white spots, the forewing having two additional minute streaks between the subcostals. *Forewing* also with a distinct small white costal spot, one within end of the cell, and one on the disc between the upper and middle median veinlets. Underside paler olivaceous-brown than in male; marked as on upper side, and with the discal spots as in male, the cell spot on the forewing being lunate, and the elongated streak below the median violet-white. *Body* dark brown; thorax in front and beneath, head, and palpi, black, prominently white spotted, legs black, femora beneath white streaked.

Expanse, ♂ $3\frac{1}{4}$, ♀ $3\frac{1}{2}$ inches.

HABITAT.—Sunderbunds, Lower Bengal.

A male and female of this species is in Colonel Swinhoe's collection, recently received by him from Mr. L. De Nicéville, and which was erroneously labelled in the handwriting of the latter Entomologist as an example of *Crastia vermiculata*.

TRONGA BISERIATA (Plate 21, fig. 1, 1a, b, c, d, ♂ ♀).

Tronga biseriata, Moore, Proc. Zool. Soc. Lond. 1883, p. 266, ♂.

IMAGO.—Male. Upperside. Very dark purplish violaceous-brown, without gloss. *Forewing* with a very small white spot on the costa above end of the cell, a small spot on the disc between the upper and middle median veinlets, a submarginal row of five (or six) larger white spots, the second upper spot being the largest and oval, the lower decreasing in size; and a marginal row of small white spots. No sexual mark. *Hindwing* with a submarginal and marginal (in some only the latter) row of very small white spots; anterior border broadly glossy-cinereous and clothed with closely-applied somewhat narrow round-tipt scales, which are broader than those on this part in *Crastia Esperii*. Underside somewhat paler, but of a brighter tint. Both wings marked as on the upperside. *Forewing* also with a small violet-white spot within end of the cell, and a large lobate discal spot between the middle and lower median veinlets, and sometimes a slender upper discal spot beyond the cell; a broad streak between the lower median and submedian vein, clothed with broad brown round-tipt scales, numerous very narrow laxly-projecting white scales and some short thread-like white scales, the posterior border beneath being clothed

with widely-separated long narrow round-tipt scales. *Hindwing* also with a small violet-white cell spot and five discal spots, the upper one large and rounded, the two next slender, the others small. Female. Upperside somewhat paler and more olivescient in tint than in male. Both wings with the marginal rows of white spots, the submarginal row on hindwing sometimes obsolescent anteriorly. *Forewing* also with the costal spot, a small cell spot, and four discal spots, the upper and lower of which are slender, the latter less defined. Underside marked as in the male. *Forewing* also with an elongated violet-white streak between the lower median and submedian vein, the posterior border beneath being glossy-cinereous. Sometimes there are also two or three additional upper discal small slender spots. *Body* dark brown; head, palpi, and thorax black, spotted with white; legs black; abdomen beneath with whitish segmental bands and lateral spots.

Expanse, 3 to 3½ inches.

HABITAT.—Nicobars.

DISTRIBUTION.—Occurs on the island of Trinkut, Great Nicobar, Little Nicobar, Nancoury, and Pulo Kondul.

This species has a great resemblance to *Crastia Esperii*, also from the Nicobars, but may be distinguished from it by the absence of the sexual mark, and in all the markings being generally smaller. It is also allied to *Tronga Niasica*.

INDO-MALAYAN ALLIED SPECIES OF *TRONGA*.—*T. Marsdeni* (Moore, P. Z. S. 1883, 266). An intermediate form between *T. Bremeri* and *T. Crameri*. Figured in "Distant's" Rhop. Malayana, p. 411, pl. 39, fig. 1, ♂. *Habitat*. Singapore.—*Tronga Heylartsii*, n. sp. male. Upperside uniform olivaceous-brown. *Forewing* with a small white costal spot, one on the disc between the middle and lower median veinlets, a submarginal row of nine prominent white spots, the upper three being small and slender, the others large, the fourth largest and oval, the next four angular, the lowest constricted; a marginal row of small spots. *Hindwing* with a submarginal row of prominent large white spots, the second lower quadrate, the next four conical, the upper rounded; and a marginal row of small spots. No sexual mark. Underside with similar markings. *Forewing* also having two lower discal paler spots. *Hindwing* also with five minute paler discal spots. Expanse, 3½ inches. This species is a mimick of *Crastia Distanti*. *Habitat*. Sumatra (Coll. Staudinger No. 383).—*T. Crameri*, Lucas (Moore, Catal. Lep. E.I.C. i. 129), of which a figure is given in "Butt. of India," pl. 8, fig. 15, ♂. *Habitat*. Borneo.—*T. Moorei* (Butler, P. Z. S. 1866, 277, ♂). A smaller species, and nearer to *T. Brookei*. *Habitat*. Sumatra.—*T. Niasica* (Moore, P. Z. S. 1883, 267, ♂). Figured in Kheil's "Rhop. Insel Nias," 17, pl. 1. fig. 2, ♂ 1884. *Habitat*. Nias Island, W. Coast of Sumatra.—*T. Brookei* (Moore, P. Z. S. 1883, 268). Comparatively smaller and narrower winged than *T. Crameri*; of a paler brown colour, and with a violet-blue tint.

Habitat. Sarawak, Borneo.—*T. Labuana* (Moore, *id.* 268). *Habitat.* Labuan, Borneo.—*T. Daatensis* (Moore, *id.* 268). *Habitat.* Island of Daat, off Labuan, Borneo.—*T. Pryeri* (Moore, *id.* 269). Near to *T. Bremeri*. *Habitat.* Sandakan, N. Borneo.

Genus CRASTIA.

Crastia, Hübner, Verz. bek. Schmett. p. 16 (1816). Moore, Proc. Zool. Soc. Lond. 1883, p. 276.

Euplœa, Boisduval, Doubleday. Butler, Journ. Linn. Soc. Zool. XIV. p. 299 (1878). Moore, Lep. of Ceylon, i. p. 11 (1880).

Euplœa (sect. *D. part*), Distant, Rhopalocera Malayana, p. 32 (1882).

Euplœa (Group 6, sect. *A.*), Marshall and De Nicéville, Butt. of India, i. p. 79 (1882).

IMAGO.—*Forewing* elongated, triangular; costa slightly arched, apex hardly rounded, exterior margin oblique, very slightly waved and concave in the middle; posterior margin almost straight in both sexes. *Male* with a very short slender *sexual mark* between the lower median and submedian vein, which, as seen under the 'binocular' appears at first sight as if reticulated, but it is clothed with well-separated short broad serrated (with five or six points) tipt scales, and others much narrower, with either two or three points; costal vein extending to nearly two-thirds the margin; first subcostal branch emitted at one-fifth before end of the cell, second from extreme end of the cell, third about one-third beyond the cell, fourth and fifth at one-third before the apex; upper discocellular veinlet shortest, inwardly-oblique, angled outward close to the subcostal and emitting a spur from its lower end within the cell, lower discocellular outwardly-oblique and angled outward close to its upper end, the radials starting from their upper angles; median branches from angles wide apart; submedian slightly recurved, with a short slender lower veinlet at its base. On the underside the *sexual mark* is clothed with narrow round-tipt scales, and a few intervening slender pointed scales. *Hindwing* short, bluntly oval; costa slightly arched in the middle; costal vein short, curved near the base; precostal short, forked; first subcostal branch emitted from angle before end of the cell; discocellulars outwardly-oblique, upper shortest and concave, lower slightly convex, the radial from their middle; median branches from angles widely apart; submedian vein straight; internal vein curved at its base. *Body* long, slender; antennæ slender; legs squamose, tibiæ and tarsi spinous beneath; palpi short, very compactly pilose.

LARVA with three anterior pair and one posterior pair of fleshy filaments.

Type.—*C. Core* (Cramer).

CRASTIA VERMICULATA (Plate 22, fig. 1, 1a, b, c, ♂ ♀).

Euplœa vermiculata, Butler, Proc. Zool. Soc. Lond. 1866, p. 276; *id.* Journ. Linn. Soc. Zool. xiv. p. 301 (1878). Marshall and De Nicéville, Butt. of India, i. p. 81 (1882).

Crastia vermiculata, Moore, Proc. Zool. Soc. Lond. 1883, p. 277.

Limnas M. Cora, Hübner, Samml. Exot. Schmett, Bd. i. pl. 25, fig. 1, 2 (1806).

IMAGO. Differs from *C. Core* in its somewhat general larger size, and paler

outer borders. In both sexes the *forewing* has the submarginal series of spots always larger, especially towards the apex, they are generally cordate, and nine, sometimes ten in number, the narrow costal spots being always present. On the *hindwing* both rows of spots are also of larger size, and in the male some of the upper submarginal series coalesce with their two corresponding marginal spots. Underside of a decidedly more olivaceous-brown tint, marked as on upperside, but more prominent, with the discal violet-white spots as in *C. Core*.

Expanse, $3\frac{1}{4}$ to 4 inches.

HABITAT.—N.W. and E. Himalayas.

DISTRIBUTION.—*C. vermiculata*, as above described, appears to have its limit in the Himalayas; it is, however, occasionally found in various lower contiguous districts. In the N.W. Himalayas it has been taken at Kasauli; and by Col. Lang at Simla, in June. Also at Masuri. In Kumaon, according to Mr. Doherty (Journ. Asiat. Soc. Beng. 1886, 114), it is "common as high up as Khati, 7000 feet elevation." Mr. De Nicéville says (Butt. India, i. 81) that "in the N.W. Himalayas it occurs up to an elevation of about 8000 feet, but is never common at that altitude." Specimens have also been taken in November at Naiashahr in the Saharunpur district, and by Capt. Hellard at Allahabad. Mr. De Nicéville also says (Journ. Asiat. Soc. Beng. 1881, 49) that it is "very common in the Sikkim Terai in October," and Mr. Elwes writes (Tr. Ent. Soc. 1888, 302) that it is "fairly common at low levels in Sikkim during the whole year." It was also obtained in Nepal by Gen. G. Ramsay.

CRASTIA CORE (Plate 23, fig. 1, *larvæ* and pupæ, 1b, c, d, ♂ ♀).

Papilio Core, Cramer, Pap. Exot. iii. pl. 266, fig. E, F, ♂ (1780). Herbst, Pap. pl. 120, fig. 3, 4 (1793).

Euplea Core, Butler, Journ. Linn. Soc. Zool. xiv. pp. 291, 301 (1878). Marshall and De Nicéville, Butt. of India, i. p. 80, pl. 9, fig. 16, ♂ ♀ (1882). Staudinger, Exot. Schmett. pl. 26, ♂ (1885).

Crastia Core, Moore, Proc. Zool. Soc. Lond. 1883, p. 277, pl. 29, fig. 8, ♂.

Danaïs Coreta, Godart, Encycl. Méth. ix. p. 178 (1819).

IMAGO.—Male. Upperside rich dark velvety rufescent-brown, outer borders paler. *Forewing* with a distinctly defined submarginal series of small brownish-white anteriorly-decreasing rounded spots, and a marginal row of smaller spots, the latter not extending to the apex. *Male with a very short slender inconspicuous sexual streak* between the lower median and submedian vein, clothed with well-separated short broad serrated-tipt scales (with five or six points), and others much narrower with either two or three points. *Hindwing* darkest towards the lower basal area; costal border brownish-cinereous; with a submarginal row of rather large brownish-white anteriorly-decreasing spots, of which the posterior eight are oval, the anterior more rounded, and a marginal row of smaller rounded spots. Cilia alternated with white. Underside paler, darkest on the disc of the *forewing*; sub-

marginal and marginal row of spots on both wings as above, but more prominent and whiter; some white dots at base. *Forewing* with a small violet-white spot on the costa above end of the cell, and sometimes two slender spots between the second and third subcostal branches, a spot within lower end of the cell, two or three on the disc, the third or upper, when present, very slender; a slender elongated brown-and-white streak between the lower median and submedian vein, clothed with narrow round-tipt scales, and a few intervening slender pointed scales; the posterior margin broadly glossy brownish-cinereous. *Hindwing* with a small violet-white spot within end of the cell, and a curved series of five or six discal spots.

Female. Slightly paler, and of a slightly olivescence-brown tint; submarginal and marginal row of spots on both wings as in male. *Forewing* with the posterior margin straight; sometimes with a white costal dot above end of the cell, and one, occasionally two, on the disc. Underside also paler; marked as in male, except that on the forewing, the elongated streak between the median and submedian veinlet is entirely white; and on the hindwing there are sometimes two or three white dots between the costal and subcostal vein. *Body* dark brown; thorax in front and beneath, head, and palpi black, white spotted; legs black, femora beneath white streaked; abdomen beneath with white segmental bands and lateral spots.

Expanse, $2\frac{3}{4}$ to $3\frac{3}{4}$ inches.

YOUNG LARVA.—"When hatched the filamentous appendages are almost invisible. *After first moult* $\frac{1}{4}$ inch long; ground colour reddish-brown; dorsal line faint; lateral line waved, narrow, and yellow; sides brick-red; on each segment are four or five transverse bands of yellowish; abdomen pinkish; prolegs black, with a reddish ring around each near the base; head black, bordered by white, with a triangular white mark on the centre; stigmata black; on the 3rd, 4th, 6th, and 12th segments, on either side of dorsal line is a short black appendage of a jet-black colour, the longest being on the 3rd segment; those on the 6th are united on the back by a broad black transverse band."

ADULT LARVA.—"One and a quarter inch long; body cylindrical; ground colour and general description as after the first moult, with one exception, the appendages are long and movable 'ad libitum' by the larva."

CHRYSLIS.—"Changed August 14th; pendulous; yellow, short and thick, swollen much at the base, marked with olive and spotted here and there with black; half an inch long. On the second day, the yellow turned to a golden and silver hue intermixed, quite metallic; a few days after it was shaded with emerald green and purple, both of the finest metallic hue towards the head. Before emerging it turned to a rich purple black, with a white fascia on either side. Imago emerged August 21st" (*Chaumette*, Lucknow; MS. Notes, 1860).

HABITAT.—India generally (south of the Himalayas).

The illustrations of the larvæ and pupæ of *C. Core* on our Plate 23 are from the following sources. Figure 1 is from the original drawings made in Malabar by Mr. S. N. Ward, and which was accompanied by the drawing of the perfect insect. Figure 1a is from the original drawings made in Madras for Sir Walter Elliot in 1853, feeding on *Cryptolepis pauciflora*. These two figures are given, in the original drawings, with the figures of male and female imago of *C. Core*.

HABITS AND FOOD PLANTS OF LARVA.—“Feeds on the leaves of the common oleander (*Nerium odorum*). Habits solitary and slow. Went into chrysalis August 14th. Imago emerged August 21st” (*Chaumette*; Lucknow). “Common on the Malabar coast, where it mostly feeds on the oleander. The chrysalis is very much affected by parasites of different kinds, and are often found with a round hole from which they have escaped” (*Ward*, MS. Notes). In Madras, Sir Walter Elliot reared the larvæ on *Cryptolepis pauciflora* and on *Ficus indica*, the pupa being formed on August 27th, and the imago emerging on September 3rd (*Elliot's* MS. Notes). Dr. Leith, who reared this insect in Bombay, has furnished me with the following Note, which is somewhat different from that given above by Capt. Chaumette:—“Larva $1\frac{1}{4}$ inch long; cylindrical, with four pairs of fleshy spines, the points of which it can curve; above dove-colour, with numerous transverse narrow and lighter streaks, and here and there a little yellow; two rows of black dots along each side, those of one row alternating with those of the other, the lower row on a white band that extends along each side. When alarmed it arches its anterior segments, and draws its head under them. Pupa suspended by posterior end; ovate, a little contracted in the middle; sculptured and metalloïd as if of burnished gold, with bead-like white longitudinal markings on the round posterior end. Pupa, August 14th; Imago, August 23rd; ditto, September 4th, and Imago, September 12th.” Mr. E. H. Aitken, in Journ. Bombay Natural History Society, 1886, p. 128, writes:—“In Bombay this insect feeds on the oleander, but on the hills I have found the larvæ on the wild fig (*Ficus glomerata*). The larva, like those of all the Euploeinæ, rests on the underside of the leaf, a position which exposes it to the notice of birds; but it affects no concealment, and is evidently not edible. The pupa, like a nugget of burnished silver, seems designed to attract attention.”

HABITS OF IMAGO.—“Is fond of frequenting gardens, where it hovers about from one plant to another. It is easy in its flight, and is to be found on the wing from July to November at Lucknow” (*Chaumette*). According to Mr. E. H. Aitken (Journ. Bombay Nat. Hist. Soc. 1886, p. 128) “this insect is a great traveller, as indeed are all the Euploeinæ. They are often to be seen crossing Bombay Harbour from one island to another, and it is a curious question whether they see the land in the distance, or go on in the ‘spirit of Columbus.’”

DISTRIBUTION AND HABITS.—According to Col. A. M. Lang (Entom. M. Mag. 1864,

104) it is "abundant in Oudh and Umballa. Larva feeds on *Nerium odorum*, a dozen of its silver pupæ being seen on one bush, glittering like beautiful earrings." Capt. Chaumette (Ent. M. Mag. 1865, 37) "obtained it all along the road from Bombay to Saugor; flying usually in the vicinity of the oleanders. Flight easy, not moving its wings much, but soars about, never flying above ten feet from the ground." Colonel Swinhoe says (P. Z. S. 1881, 603) that "*C. Core* is taken at Hyderabad in Sind, and is stated to be taken at Karachi, but has not been observed there by me." Capt. Lloyd obtained it in Kattywar in 1873, and Mr. Wilkinson took it in Kutch. It is "very plentiful at Mhow in March, rare in June" (Swinhoe, P. Z. S. 1886, 421). "Common everywhere in Bombay and the Dekkan all the year round" (Swinhoe, P. Z. S. 1885, 126). Mr. G. F. Hampson (J. Asiat. Soc. Beng. 1888, 348) records it from the Nilgiris. It is very common at Khorda in Orissa, according to Mr. W. C. Taylor. In Calcutta, Mr. De Nicéville says it is "an exceedingly plentiful insect during the cold months. It has a slow, weak flight, and continually settles." At Barrackpur, Mr. Rothney (Ent. M. Mag. 1882, 34) found it "very common from March to October," and says that it "has a heavy lazy flight; frequenting the shade of banian trees, bamboo topes, &c., and is very fond of settling on damp ground. Frequently taken in 'coitu.'" Mr. Wood-Mason (Journ. Asiat. Soc. Beng. 1880, 226) records a single female specimen, forwarded in 1872 by the native collector, Moti Ram, from Port Blair, Andaman Islands. This latter locality, however, requires verification, as Mr. Wood-Mason subsequently remarks that no specimens have since been received from the Andamans.

CRASTIA ASELA (Plate 24, fig. 1, 1a, larva and pupa I, b, c, d, ♂ ♀).

Euplaea Asela, Moore, Annals and Mag. of Nat. Hist. 1887, p. 45; *id.* Lepidoptera of Ceylon, i. p. 11, pl. 6, fig. 2, 2a, larva and pupa (1880). Marshall and De Nicéville, Butt. of India, i. p. 81 (1882).

Crastia Asela, Moore, Proc. Zool. Soc. Lond. 1883, p. 277.

IMAGO.—Male and female. Upperside dark velvety olivaceous-brown, outer borders broadly paler. *Forewing* with a submarginal and less distinct lower marginal row of very small brownish-white spots, the former series curving to the costa before the apex. *Male with a short very slender sexual mark* between the lower median and submedian vein. *Hindwing* with a submarginal row of brownish-white oval spots, and a marginal row of smaller round spots. Underside paler; both wings with the submarginal and marginal rows of spots more clearly defined; each with a small violet-white spot at end of the cell, and a contiguous discal curved series of spots; forewing also with a small costal spot above end of the cell, and a brownish-white streak below the median, the posterior border being cinereous-brown. *Body* dark brown; thorax in front and beneath, head, and palpi black, spotted with white; legs

black; middle and hind femora white streaked beneath; abdomen beneath with white segmental bands.

Expanse, $3\frac{1}{4}$ to $3\frac{3}{4}$ inches.

ADULT CATERPILLAR.—Cylindrical; purplish-white or dove-colour, with a pair of curled reddish fleshy filaments on three of the anterior segments, and a pair on the twelfth segment; each segment transversely barred with narrow white and purplish bands, and with some red and black dots; abdominal line black; head black barred; thoracic legs pale; prolegs black, whitish ringed.

CHRYSLIS.—Golden-yellow, constricted below the thorax, streaked and banded with brown; dorsal segments black spotted.

HABITAT.—Ceylon.

DISTRIBUTION AND HABITS.—According to Mr. Hutchison (Lep. Ceylon, i. 12) it is "found everywhere in the plains, and up to 6000 feet, in forest or open ground. At Colombo it occurs from October to January; elsewhere all the year. Flight slow, heavy. Often comes into the house in numbers, sometimes settling on one's clothes." Mr. F. M. Mackwood writes, "Found in low country, numerous specimens occurring in the annual flights in November and December. The larva feeds on the oleander."

FOOD PLANT.—"Feeds on *Nerium oleander*, &c." (Hutchison).

CRASTIA GODARTII (Plate 25, fig. 1, 1a, b, c, d, ♂ ♀).

Euplea Godartii, Lucas, Rev. et Mag. Zool. 1853, p. 319, ♀. Butler, Proc. Zool. Soc. Lond. 1866, p. 275; *id.* Journ. Linn. Soc. Zool. xiv. p. 301 (1878). Moore, Proc. Zool. Soc. Lond. 1878, p. 824. Distant, Rhop. Malayana, p. 34, pl. 3, fig. 8 (1892). Marshall and De Nicéville, Butt. of India, i. p. 84 (1882).

Crastia Godartii, Moore, Proc. Zool. Soc. Lond. 1883, p. 278; *id.* Journ. Linn. Soc. Zool. 1886, p. 31.

Euplea Siamensis, Felder, Reise Novara, Lep. ii. p. 341, pl. 41, fig. 6 (1867), ♂. Druce, Proc. Zool. Soc. Lond. 1874, p. 103.

IMAGO.—Male. Upperside purplish olivaceous-brown, darkest basally. *Forewing* with a more or less broad purplish violet-grey apical patch, which is formed by a powdering of the spaces between the veins, the patch varying both in width and intensity, in some extending broadly downward to the upper or middle median veinlet and to the extreme apical margin, in others it is more or less narrow and then does not extend to the margin, and again, in others it is obsolescent; a small violet-white costal spot above end of the cell, one within lower end of the cell, one or two on the disc between the median veinlets, of which latter the upper or lower is sometimes absent, in some all are obsolescent; a more or less complete submarginal and marginal row of small white spots, which, when complete, are generally distinctly formed, and in some specimens the upper of the submarginal row are ringed with brown, in some specimens both rows are incomplete; a short sexual mark between

the lower median and submedian vein. *Hindwing* with a submarginal row of small oval brownish-white spots, and a marginal row of rounded spots, which, in extremely rare instances, are more or less obsolescent; costal margin glossy brownish-cinereous. Underside olivaceous-brown. *Forewing* with a distinct violet-white costal spot above end of the cell, and sometimes a slender spot between the second and third subcostals; a spot which is sometimes lunate within lower end of the cell, two on the disc between the median veinlets, the lower one being largest and oval; sometimes a slender spot also present between the upper median and the radial; a long brown-and-white streak between the lower median and submedian vein, the posterior border being broadly glossy cinereous; a more or less complete submarginal and marginal row of small white spots. *Hindwing* with a small violet-white cell spot, a discal series of five or six, sometimes less, small spots, a submarginal and marginal row of Prominent white spots; some white dots at base of the wing.

Female. Upperside somewhat paler. *Forewing* with the violet-grey pale apical patch, and both wings with all the markings as in the male, the lower submarginal on the forewing being sometimes large. Underside also somewhat paler. Both wings marked as in the male. *Forewing* with an elongated violet-white streak between the lower median and submedian vein. *Body* dark brown; head, palpi, thorax in front and beneath black, white spotted; legs black, femora beneath whitish; abdomen beneath with white broad bands.

Expanse, 3 to $3\frac{3}{4}$ inches.

HABITAT.—Burma; Siam.

DISTRIBUTION WITHIN INDIAN AREA.—According to Mr. De Nicéville (Butt. Ind. i. 85) "it appears to be common in Burma from February to July." Specimens have been examined and verified from Akyab in Arakan, collected in July by Capt. Adamson (Proc. As. Soc. Beng. 1882); others from Mandalay from Mr. Radcliffe in Col. Swinhoe's collection, and from the Karen Hills in Mr. Crowley's collection. It is stated (Butt. Ind. i. 85) to be "common in Rangoon during June, July, and September, and probably throughout the year." Mr. O. Limborg (P. Z. S. 1878, 824) found it in Upper Tenasserim at "Ahsown, Moulmein to Meetan, at Hatsiega, Houngduran, and from Naththoung to Paboga." It was taken "by Capt. Bingham in the Meplay Valley in February, and in the Upper Thoungyeen forests in April" (Butt. Ind. i. 85). It is recorded (J. A. S. Beng. 1887, 416) from "Tavoy and adjacent Siam Hills," and Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 31) found it abundantly in the Mergui Archipelago during the winter.

Our illustration of this species on Plate 25, fig. 1, is from a Tounghoo male; fig. 1a, d, Rangoon male and female; fig. 1b from a Karen Hill male variety in the collection of Mr. P. Crowley, and fig. c from a Moulmein female.

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. E. L. Layard (P. Z. S. 1874, 103)

obtained specimens at Chentaboon, a mountainous and thickly wooded district 200 miles from Bangkok on the east coast of the Gulf of Siam. Mr. Distant (Rhop. Malay. 34) records it from Singapore, on the authority of a specimen so labelled in the collection of Messrs. Godman and Salvin. Mr. Butler (P. Z. S. 1866, 275) records it from the Philippines, but this locality is probably erroneous, as this species is not enumerated in Semper's recently published "Reisen Archipel. Philippen."

CRASTIA LAYARDI (Plate 26, fig. 1, 1a, b, c, ♂ ♀).

Euplœa Layardi, Druce, Proc. Zool. Soc. Lond. 1874, p. 103, pl. 16, fig. 1, ♀.

Crastia Layardi, Moore, Proc. Zool. Soc. Lond. 1883, 279.

Crastia Binghami, Moore, Proc. Zool. Soc. Lond. 1883, p. 278, ♂ ♀.

IMAGO.—Nearest allied to *C. Godartii*. Upperside differs in its darker colour throughout, with violet-brown reflections, and in the entire absence of the violet-grey apical patch. Male. *Forewing* with similarly disposed but comparatively smaller submarginal and marginal row of spots, and a shorter, narrower streak between the median and submedian veins. *Hindwing* with similar submarginal and marginal spots as in *C. Godartii*. Female. *Forewing* with submarginal and marginal spots as in the male, and with minute costal and sometimes cell and discal spots as in *C. Godartii*. *Hindwing* with submarginal and marginal spots as in the male.

Expanse, ♂ ♀ $3\frac{1}{4}$ to $3\frac{3}{4}$ inches.

HABITAT.—Siam (*Layard*); Burma.

Having recently been able to compare the typical specimens of both sexes of *C. Layardi*, from Siam, now in the collection of Messrs. Godman and Salvin, with those of the types of *C. Binghami*, I have assured myself of their identity.

This species has very much the appearance of the Ceylonese *C. Asela*, but it may be easily distinguished from the latter by the less triangular forewing of the male, this wing having a decided rounded posterior margin.

DISTRIBUTION.—The Siamese specimens were taken at Chentaboon by Mr. E. L. Layard. The Burmese examples were taken by Capt. Bingham in the Thoungyeen forests in Upper Tenasserim, and by Capt. C. H. E. Adamson at Akyab in Arakan.

CRASTIA FRAUENFELDII (Plate 27, fig. 1, 1a, ♂).

Euplœa Frauenfeldii, Felder, Verh. Zool. Bot. Gesellsch. xii. p. 479, ♂ (1862); *id.* Reise Novara, Lep. ii. p. 342, pl. 41, fig. 4, ♂ (1867). Butler, Journ. Linn. Soc. Zool. xiv. p. 300, ♂ (1878).

Moore, Lep. of Ceylon, i. p. 12 (1880). Marshall and De Nicéville, Butt. of India, i. p. 83 (1882).

Crastia Frauenfeldii, Moore, Proc. Zool. Soc. Lond. 1883, p. 279.

IMAGO.—Male. Upperside blackish purplish-brown. *Forewing* blue glossed; with a very small white costal spot above end of the cell, a discal spot between the upper and middle median veinlets, and a much less defined spot between the middle

and lower medians; an upper submarginal series of five spots curving before the apex, of which the upper is on the costal border, and a lower marginal row of smaller spots; a *short slender sexual mark* between the lower median and submedian vein. *Hindwing* with very faint traces of a submarginal and marginal row of small pale brown spots. Underside dark olivaceous-brown. *Forewing* with a bluish-white costal spot, a spot at lower end of the cell, one between the upper and middle median veinlets, and a larger elongated white spot between the middle and lower medians, the sexual streak and posterior margin being brownish-white; submarginal and marginal spots as above. *Hindwing* with a minute bluish-white spot within end of the cell, and a discal series of spots, a marginal row of small white spots, and a submarginal lower series of three or four spots. *Body* black; head, thorax, palpi, and abdomen beneath white spotted, legs black. Female: Unknown.

Expanse, ♂ 4 inches.

HABITAT.—Ceylon.

This species is known only from Ceylon, where it is evidently very rare. I am acquainted only with a single male, in the collection of the British Museum, which was taken at Trincomalee, on the N.E. side of the island, and from which our illustration on Plate 27 was taken.

CRASTIA ESPERI (Plate 27, fig. 2, 2a, b, ♂ ♀).

Euplaea Esperii, Felder, Verh. Zool. Bot. Gesellsch. xii. p. 482 (1862), ♀. Moore, Proc. Zool. Soc. Lond. 1877, p. 582. Wood-Mason and De Nicéville, Journ. As. Soc. Beng. 1881, p. 227. Marshall and De Nicéville, Butt. of India, i. p. 83 (1882).

Crastia Esperii, Moore, Proc. Zool. Soc. Lond. 1883, p. 278.

IMAGO.—Male. Upperside very dark purplish violaceous-brown. *Forewing* with a very small white costal spot above end of the cell, one within lower end of the cell, three discal spots, the upper one being slender, the lower small and both sometimes obsolescent, the middle spot large and rounded; a submarginal row of six or seven, of which the two upper are slender, the next large and oval, the others decreasing in size, and a marginal row of very small spots; a *short ill-defined sexual mark* between the lower median and submedian vein, which, when first looked at under the "binocular," has the ordinary reticulated appearance, but is composed of well-separated oval scales which have either bidentate or tridentate tips. *Hindwing* with a submarginal and a marginal row of small white spots; the anterior border broadly glossy cinereous, composed of widely separated narrow round-tipt scales. Underside paler, dark olivaceous-brown. Both wings with the two marginal rows of white spots as above. *Forewing* also with the small costal white spot, and generally five discal spots, the lowest being large, and a large generally lunate cell spot; a broad sexual mark between the lower median and submedian, composed of broad

brown dentated-tipt scales, numerous brown and whitish round-tipt scales and a few interspersed very slender white scales, the posterior border being glossy cinereous and thickly clothed with raised lance-pointed scales, and from below the submedian to extreme margin with widely-separated narrow scales with equal-pointed ends. *Hindwing* also with a small white cell spot and five discal spots. *Body* dark brown; head, palpi, thorax in front and beneath black, spotted with white; legs black; abdomen beneath with slight whitish segmental bands. Female.—Paler, and of a decided olivaceous tint. Upper and underside marked similar to the male, the spots somewhat larger and more prominent, those of the submarginal row on the hindwing being longer. *Forewing* beneath with an elongated violet-white streak between the lower median and submedian vein, and a broad whitish posterior border.

Expanse, 3 to $3\frac{3}{4}$ inches.

HABITAT.—Nicobars.

Occurs only in the Nicobars, where it appears to be common. Specimens examined from Kar Nicobar and Camorta.

CRASTIA SCHERZERI (Plate 28, fig. 1, 1a, b, ♂).

Euplaea Scherzeri, Felder, Verh. Zool. Bot. Gesellesch. Wien. xii. p. 479 (1862); *id.* Reise Novara, Lep.

ii. p. 335 (1867). Moore, Lep. of Ceylon, i. p. 12 (1880). Marshall and De Nicéville, Butt. of India, i. p. 85 (1882).

Betanga Scherzeri, Moore, Proc. Zool. Soc. Lond. 1883, p. 273.

IMAGO.—“Male. Upperside deep fuscous, much paler and brownish on the exterior margin. *Forewing* with a single short velvety streak in the interior. Underside. Both wings concolorous, but a little paler. *Forewing* with two internal whitish streaks, the upper one narrow, linear; a spot and two discal dots, a spot below the middle of the costa, and two subapical, bluish-white. *Hindwing* with five very small discal spots, one of which is in the cell, bluish-white” (Felder).

Expanse, $3\frac{3}{4}$ inches.

HABITAT.—Ceylon (Felder).

This species, of which at present, we only know the type specimen described by Dr. Felder, now in the Zoological Museum at Vienna, and of which I am indebted to the kindness of Dr. A. F. Rogenhofer, the Custodian of the Vienna Museum, for a coloured drawing, which is reproduced on our Plate 28, figs. 1, 1a. Its habitat, as given by Dr. Felder, is stated to be Ceylon. It is extremely near the next species (*C. Camorta*), and may possibly be identical with it. From *C. Camorta* it differs in its more uniform colour on the upperside, and in the absence of the pale iridescent upper discoidal patch on the hindwing. The underside also is more uniformly coloured, the forewing having two subapical small white spots, and the hindwing a less number of discal spots. The description of this species, as given in the “Lep.

of Ceylon," vol. i. p. 12, was taken from a Java specimen, so labelled by Mr. Butler, in the British Museum collection, which, as is now evident, was erroneously referred to as this species, in his Memoir on the genus *Euplœa* in P. Z. S. 1878, p. 300.

CRASTIA CAMORTA (Plate 28, fig. 2, 2a, b, c, ♂ ♀).

Euplœa Camorta, Moore, Proc. Zool. Soc. Lond. 1877, p. 532, ♂. Wood-Mason and De Nicéville, Journ. Asiat. Soc. Bengal, 1881, p. 228; *id.* 1882, p. 15. Marshall and De Nicéville, Butt. of India, i. p. 86 (1882).

Crastia Camorta, Moore, Proc. Zool. Soc. Lond. 1883, p. 279, pl. 31, fig. 7, ♂.

IMAGO.—Male. Upperside very dark umber-brown, suffused in some lights with a purplish violet-blue gloss, paler on outer borders. *Forewing* with a short straight narrow sexual mark between the lower median and submedian vein. *Hindwing* with the anterior border broadly cinereous and slightly iridescent, an ill-defined broad spatular adpressed patch of modified scales of a paler iridescent cinerous-brown extending along both sides of the subcostal to beyond upper end of the cell. Underside paler, the outer borders also broadly paler and of a cinnamoneous tint. *Forewing* with four bluish-white spots, one being on the costa above end of the cell, one within lower end of the cell, the other two outside the cell between the median veinlets, the sexual streak long, narrow, the ends ochreous-white, the contiguous lower patch ochreous-white, the extreme posterior margin being glossy cinereous. *Hindwing* with a small bluish-white spot within end of the cell, and a curved series of six small discal spots, the upper one being slender; small white spots also at base of the wing. Female. Upperside dark brown, of a cinnamoneous tint, the outer borders of both wings broadly paler and of a decidedly pale cinnamoneous colour. *Forewing* with a more or less conspicuous violet-white spot above end of the cell, and one beyond the cell between the upper and middle median veinlets. *Hindwing* with the costal border broadly pale brownish-cinereous, and a whitish ill-defined spot between the subcostals. Underside paler, the outer broad borders much paler, and of a somewhat cinnamoneous tint. *Forewing* with a conspicuous bluish-white costal spot above end of the cell, one within end of the cell, and two on the disc between the median veinlets; a lengthened cinereous-white streak beneath the lower median veinlet, and a contiguous broader lower patch extending along the posterior margin. *Hindwing* with a bluish-white spot within end of the cell, and a curved series of six small discal spots, the upper one slender; some white dots at base of the wing. *Body* blackish-brown; thorax in front and beneath, head, palpi, and legs black, slightly white spotted; abdomen beneath with white segmental bands.

Expanse, ♂ $2\frac{3}{4}$ to $3\frac{1}{4}$, ♀ $3\frac{1}{4}$ to 4 inches.

HABITAT.—Nicobars.

DISTRIBUTION.—Numerous specimens of this species were obtained by Mr. F. A.

De Roëpstorff on the island of Kamorta. It also occurs on the islands of Nankowri, Katschall, and Kar Nicobar.

MIMICKS.—The female of *Elymnias Cottonis*, in a certain degree, resembles this species, and so too, in a lesser degree, does that of *E. Mimus*.

INDO-MALAYAN ALLIED SPECIES OF CRASTIA.—*C. graminifera* (Moore, P. Z. S. 1883, 277); nearest allied to *C. vermiculata*. *Habitat*. Malay Peninsula.—*C. Distanti* (Moore, Ann. N. H. 1882, 453), also described and figured in Mr. Distant's "Rhop. Malayana," p. 32, pl. 5, fig. 9, ♂. *Habitat*. Malay Peninsula; Sumatra.—*C. inconspicua* (Moore, P. Z. S. 1883, 279), a smaller insect, allied to *C. Layardi*. *Habitat*. Sumatra.—*C. Amymonæ* (Godart, Enc. Meth. ix. 179). *Habitat*. Sumatra, Cochin China.—*C. Lorquini* (Felder, Reise Nov. Lep. 340). *Habitat*. S. China.—*C. Felderi* (Butler, P. Z. S. 1866, 275). *Habitat*. Sumatra, Hongkong.—*C. prunosa* (Moore, l. c. 280), allied to *C. Amymonæ*. *Habitat*. China.—*C. Hawthorthi* (Lucas, Rev. Zool. 1853, 317), of which the following are synonyms:—Hubneri, Moore, Janus, Butler, Moorei, Felder, and figured erroneously as *Elusina*, in Hubner's "Exot. Schmett." ii. pl. 9, fig. 1, 2. *Habitat*. Java.—*C. Snelleni* (Moore, P. Z. S. 1883, 280), also described and figured in Semper's Reisen Arch. Philippen. p. 22, pl. 3, fig. 10, 11, ♂ ♀. *Habitat*. Mindanao, Philippines.

BUTTERFLY MIMICKS OF INDIAN SPECIES OF CRASTIA.—Certain species of the Papiilionid genus *Chilasa*, in colour and pattern of markings, resemble the following species of *Crastia*,—namely, *Chilasa Panope* mimicks the *C. vermiculata*, *Chilasa Casyapa* the *C. Core*, *Chilasa Lankeswara*, of Ceylon, the *C. Asela* of that island, and *Chilasa Onpape*, of Burma, the *C. Layardi*; these four species of *Chilasa* also having the relatively-decreasing size of the marginal markings on both wings, as is the case in the four consecutively above-mentioned species of *Crastia*. The female of a species of the Nymphalid genus *Hypolimnias*, namely *H. Bolina*, is also an excellent mimick of *C. Core*.

Genus MAHINTHA.

Mahintha, Moore, Proc. Zool. Soc. Lond. 1883, p. 280.

IMAGO.—Male. Wings short, broad. *Forewing* somewhat the shape of *Salpinx*, but less quadrate; costal margin arched; exterior margin nearly erect, waved, slightly angular below the apex and above the posterior angle; posterior margin long, convex, with a short slender sexual mark. *Hindwing* broad, obovate; exterior margin waved.

MAHINTHA SUBDITA (Plate 29, fig. 1, 1a, b, c, ♂ ♀).

Euplaa subdita, Moore, Proc. Zool. Soc. Lond. 1878, p. 823. Marshall and De Nicéville, Butt. of India, i. p. 82 (1882).

Mahintha subdita, Moore, Proc. Zool. Soc. Lond. 1883, p. 281.

IMAGO.—Male. Upperside dark olivaceous-brown. *Forewing* with the basal

area darkest and slightly glossed with violaceous-blue, with the small cell spot and the two discal spots of the underside slightly visible, and a more distinct row of very small submarginal and marginal row of brownish-white spots; *sexual mark short, slender*, and distinctly blue in some lights. *Hindwing* darkest basally, with a submarginal row of small ovate brownish-white spots, and a marginal row of smaller conical spots. Underside paler. *Forewing* with a small violet-white costal spot, a cell spot, two discal spots, a larger white oval, lower discal spot, and submarginal and marginal row of spots as on upperside. *Hindwing* with a very small violet-white cell spot, five discal spots, submarginal and marginal spots as above. *Body* dark brown; thorax, head, and palpi black, white spotted; legs black, fore femora white beneath; abdomen beneath with broad white bands. Female. Upperside paler. *Forewing* with a small white costal spot; the cell and discal spots slightly visible; a submarginal incomplete row of very small brownish-white spots and a lower marginal row of more defined spots. *Hindwing* with submarginal and marginal row of ovate brownish-white spots. Underside paler. Both wings marked as upperside. On the forewing, the costal, cell, and two discal spots are larger, clearly defined and violet-white; a white streak below the median. *Hindwing* also with a violet-white small cell spot, and a discal series of six spots.

Expanse, ♂ $3\frac{1}{2}$, ♀ $3\frac{3}{8}$ inches.

HABITAT.—Upper Tenasserim.

DISTRIBUTION.—Obtained by Mr. O. Limborg at Hatsiega in Upper Tenasserim. Mr. De Nicéville (Butt. of Ind. i. 82) records the capture of specimens, which he refers to this species, by Mr. J. Wood-Mason "at Akyab, in September." Our figure of the female is from an Akyab specimen in Mr. Distant's collection.

Genus KARADIRA.

Karodira, Moore, Proc. Zool. Soc. Lond. 1883, p. 281.

Euplaea (Sect. *B*, part), Marshall and De Nicéville, Butt. of India, p. 80 (1882).

IMAGO.—Male. *Forewing* somewhat elongated and quadrate, costa arched, apex rounded, exterior margin oblique and wavy, posterior angle somewhat pointed, posterior margin very convex in the middle, *sexual mark short*, clothed with widely separated small narrow slightly bidentate-tipt scales. *Hindwing* short and broadly oval, exterior margin wavy.

Differs from typical *Crastia* in the forewing of the male having the posterior margin very considerably produced into a broad convex lobe, a comparatively broader and shorter cell, the submedian vein slightly recurving and terminating much below the posterior angle, and with a broader medium-sized sexual mark; hindwing also much more rounded in form.

KARADIRA ANDAMANENSIS (Plate 30, fig. 1, 1a, b, c, ♂ ♀).

Euplœa Andamanensis, Atkinson, Proc. Zool. Soc. Lond. 1873, p. 736, pl. 63, fig. 2, ♂. Butler, Journ. Linn. Soc. Zool. xiv. p. 300. Moore, Proc. Zool. Soc. Lond. 1877, p. 582. Wood-Mason, Journ. Asiat. Soc. Beng. 1880, p. 226; *id.* 1881, p. 244. Marshall and De Nicéville, Butt. of India, i. p. 84 (1882).

Karadira Andamanensis, Moore, Proc. Zool. Soc. Lond. 1883, p. 281.

IMAGO.—Male and female. Pale olivescient fuliginous-brown, darkest externally. *Male.* Upperside. *Forewing* paler on posterior border, with a prominent white costal spot above end of the cell, and sometimes two smaller spots between the second and third subcostals, a larger spot within lower end of the cell, and two on the disc between the median veinlets; a submarginal recurved row of spots, of which the three lower are much the largest and either quadrate and sometimes touching the discal spots, or with their outer ends convex, or broadly oval in shape, the lowest spot also sometimes being divided into two; the marginal row of spots are small and narrowly oval, and do not extend to the apex; a *short sexual mark* between the lower median and submedian vein, clothed with widely separated small narrow ovate slightly bidentate-tipt scales. *Hindwing* with a submarginal row of white oval spots, and a marginal row of smaller spots; costal border broadly glossy brownish-cinereous. Cilia alternated with white. Underside somewhat paler; both wings with white spots as on upperside. *Forewing* also with a very slender discal spot between the upper median veinlet and the radial; posterior border broadly glossy cinereous, the sexual mark clothed with densely packed short narrow ovate point-tipt scales. *Hindwing* also with a violet-white spot within end of the cell, and a discal series of five or six smaller spots; some white dots at base of the wing. *Female.* Upperside as in male, except that the forewing has the posterior margin straight instead of being convex, and with an additional lower discal narrow white spot. On the hindwing the small cell spot and discal spots of the underside are slightly apparent. Underside as in male. *Body* dark fuliginous-brown; thorax in front and beneath, head, and palpi black, spotted with white; legs black, the femora being white; abdomen beneath with broad whitish segmental bands.

Expanse, 3 to 3½ inches.

HABITAT.—Andaman Isles.

Obtained "commonly at Port Blair from March to August, by Col. T. Cadell, Chief Commissioner of the Andamans, and by the late Mr. F. A. De Roëpstorff" (Butt. of India, i. 84).

Genus PENOA.

Euplœa (Sect. *D*, part), Distant, Rhop. Malayana, p. 32 (1882).

Euplœa (Group 6, Sect. *C* and *D*), Marshall and De Nicéville, Butt. of India, &c., p. 80 (1882).

Penoa, Moore, Proc. Zool. Soc. Lond. 1883, p. 274.

IMAGO.—Male. *Forewing* broad, costa arched, apex and posterior angle rounded,

posterior margin convex; *sexual mark* between lower median and submedian vein long, broad, and conspicuous, clothed with well-separated narrow tapering scales with either bidentate or tridentate tips, and a few intervening slender pointed scales. On the underside of the wing the sexual streak is clothed with minute round-tipt scales, innumerable longer slender claviform and thread-like scales bristling all over the surface. *Hindwing* broad, apex and posterior angle convex, exterior margin oblique. Palpi short, thick, laxly hirsute, tip pointed.

Type.—P. Alcatheö.

From typical *Crastia* the males of this genus differ in having a conspicuously less triangular form of forewing, which is also broader, and either glossed with purple-violet or deep-blue, and in possessing a much longer and broader sexual streak.

PENOA ALCATHOË (Plate 31, fig. 1, 1a, b, c, ♂ ♀).

Danaüs Alcatheö, Godart, Encycl. Méth. ix. p. 178 (1819).

Euplexa Alcatheö, Butler, Journ. Linn. Soc. Zool. xiv. p. 301 (1878). Marshall and De Nicéville, Butt. of India, i. p. 86, pl. 9, fig. 17, ♂ ♀ (1882).

Penoa Alcatheö, Moore, Proc. Zool. Soc. Lond. 1883, p. 274; *id.* Journ. Linn. Soc. Zool. 1886, p. 31.

Euplexa Doubledayi, Felder, Reise Novara, Lep. ii. p. 337 (1867).

IMAGO.—Male. Upperside dark purplish violet-brown. Cilia white spotted. *Forewing* with violet-blue reflections in certain lights, and occasionally the lower marginal spots of the underside slightly visible; a straight elongated rather broad *sexual mark* between the lower median and submedian vein, clothed with well-separated narrow tapering scales, either with bidentate or tridentate tips, and a few intervening slender pointed scales. *Hindwing* paler, and of a more rufescent-brown exteriorly; the costal border glossy brownish-cinereous, the upper discoidal area blackish, and clothed with narrow round-pointed scales, numerous very slender slightly clavate and a few thread-like scales; with a submarginal row of elongated brownish-white anteriorly decreasing spots, disposed in pairs between the veins, and a marginal row of small spots, the basal two or three spots of both rows being confluent. Underside paler, purpurescent olivaceous-brown. *Forewing* with a bluish-white costal spot above end of the cell, one within end of the cell, another on the disc between the upper and middle median veinlets, and sometimes a short streak also between the upper median and lower radial; a large white discal spot between the middle and lower median veinlets; an elongated greyish-brown *sexual streak* between the lower median and submedian vein, clothed with densely packed small narrow round-pointed brown scales, numerous interspersed very slender claviform white long scales bristling out, intermixed with a few extremely fine claviform scales, the posterior border being glossy cinereous-brown. *Hindwing* with whitish elongated submarginal spots, and marginal spots, as on upperside, also a small bluish-white spot

within lower end of the cell, and a discal series of three or four spots; some white dots at base of the wing.

FEMALE. Upperside much paler. *Forewing* with a more or less distinct small violet-white costal spot above end of the cell, one within end of the cell, two on the disc, and traces of a third above the submedian; a submarginal row of small slightly obsolescent spots, the upper ones being minute or obsolete, and a similar lower marginal row of minute spots. *Hindwing* with the elongated submarginal spots, and marginal row of spots as in the male. Underside much paler; marked as on upper-side; the *forewing* also having a violet-white streak below the lower median veinlet and another along the posterior margin; *hindwing* also with a violet-white spot at end of the cell, and a discal series of four or five very small spots. *Body* dark brown; thorax in front and beneath, head and palpi black, spotted with white; legs black, fore femora white beneath; abdomen beneath with white segmental bands and lateral spots.

Expanse, ♂, $3\frac{1}{4}$ to $3\frac{3}{4}$, ♀, $3\frac{1}{2}$ to $3\frac{3}{4}$ inches.

HABITAT.—Assam, Naga Hills, Cachar, Silhet, Manipur, Upper and Lower Burma.

DISTRIBUTION.—According to Mr. De Nicéville (Butt. Ind. i. 87) it is “not uncommon in Sikkim.” Mr. Elwes (Trans. Ent. Soc. 1888, 302), however, mentions that he “has not seen any specimen from that locality.” It is therefore doubtful if this insect does occur in Sikkim. At Shillong, in Assam, it has been taken by Mr. J. P. Cock, in May. Mr. J. L. Sherwill records it in his recent list of Naga Hill butterflies, and Mr. Wood-Mason found it “common in Cachar in May and June” (J. A. S. Beng. 1886, 345). Dr. G. Watt obtained it on the Manipur Hills in May. It occurs at Akyab in Arakan. A specimen in Col. Swinhoe’s collection, received from Mr. Noble, was obtained at Bhamo in Upper Burma, in November. It has also been received from the Karen Hills, and has been taken in Pegu, in May, and at Moulmein, in June. Mr. Limborg (P. Z. S. 1878, 823) found it at Ahsown at 2000 feet elevation in Upper Tenasserim, and Capt. Bingham obtained it in the Thoungyeen forests, and in the Mepley Valley in February. Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 31) obtained it in the Mergui Archipelago from “December to March.”

MIMICK.—*P. Alcatheë*, in its Lower Burma habitat, is mimicked by the Papiionid butterfly, *Menamopsis Tavoyana*.

PENOA MENETRIESII (Plate 32, fig. 1, 1a, b, c, ♂ ♀).

Euploea Menetriesii, Felder, Wien. Ent. Monatsch. iv. p. 398 (1860). Druce, Proc. Zool. Soc. 1874, p. 103. Butler, Trans. Linn. Soc. Zool. 1877, p. 538; *id.* Journ. Linn. Soc. Zool. xiv. p. 301 (1878). Distant, Rhopal. Malayana, p. 34, pl. 3, fig. 4, 5, ♂ ♀ (1882). Marshall and De Nicéville, Butt. of India, i. p. 87 (1882).

Penoea Menetriesii, Moore, Proc. Zool. Soc. Lond. 1883, p. 275; *id.* Journ. Linn. Soc. Zool. 1886, p. 31.

IMAGO.—Male. Upperside dark purplish violet-brown. *Forewing* with violet-blue

reflections ; with a *very slender and rather short sexual mark* between the lower median and submedian vein. *Hindwing* paler, but darkest basally ; with a submarginal row of elongated very narrow anteriorly-decreasing, more or less obscure brownish-white spots, the uppermost one being between the costal and subcostal vein, and a marginal row of very small rounded equally-obscure spots. Underside paler ; hindwing of an olivaceous-brown tint. *Forewing* with a small prominent violet-white spot on the costa above end of the cell and sometimes a smaller one also between the second and third, and another between the third and fourth subcostals ; a spot within lower end of the cell, a small discal spot between the middle and upper median veinlets, a slender short streak above the upper median, and a larger whiter oval spot between the middle and lower medians, the *sexual streak* dull brown, and the posterior border greyish ; sometimes one or two middle submarginal and one or two lower marginal minute white spots are present. *Hindwing* with a small violet-white spot within end of the cell, a discal upper series of five or six smaller spots, a submarginal row of elongated very narrow anteriorly-decreasing white spots, and a marginal row of small oval spots, the posterior three or four of each row coalesced.

FEMALE. Upperside paler, and of a purplish olivaceous-brown tint. *Forewing* sometimes with the spots of the underside visible from above. *Hindwing* with the submarginal and marginal spots as in male, but more prominent and whitish. Underside paler. *Forewing* with more prominent violet-white costal and discal spots, a complete submarginal row of small white spots, and a lower marginal row than in male ; a broad greyish-white streak between the lower median and submedian, the posterior margin cinereous. *Hindwing* also with more prominent discal spots, and white submarginal and marginal row of spots, than in male ; some white dots at base of the wing. *Body* dark brown ; thorax in front and beneath, head and palpi black, white spotted ; legs black, fore femora white streaked.

Expanse, $3\frac{1}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—Mergui ; Malay Peninsula.

This is a generally smaller and comparatively narrower winged insect than its nearest ally, *P. Alcatheö*. The forewing of the male also has a shorter and narrow sexual streak between the lower median and submedian vein, and the hindwing in this sex has an inconspicuous series of narrower submarginal and marginal spots, whereas in *P. Alcatheö* both these rows of spots are very prominently defined. The female of *P. Menetriesii* differs from that sex of *P. Alcatheö* on the upperside of the forewing in not having the conspicuous white costal spot, and marginal spots, which are present in the latter, and in the hindwing also having the submarginal and marginal spots less white, narrower, shorter, and comparatively much less prominent.

DISTRIBUTION.—The Mergui examples collected by Dr. J. Anderson (Journ. Linn.

Soc. Zool. 1886, 31) were identified as belonging to this species. This is probably the most northern limit of its range. It is not uncommon at Malacca and Province Wellesley, in the Malay Peninsula. It is also recorded by Mr. Druce (P. Z. S. 1874, 103) from Chentaboon, in Siam. Mr. Distant (Rhop. Malayana, 34) also records it from Sumatra, and Herr Kheil (Rhop. Insel Nias, p. 17) from the island of Nias. Those from the latter place may, however, probably be the form described and figured by Weymer (Stettin Ent. Zeit. 1865, 259, pl. 1, fig. 4) as *P. Kheili*.

MIMICK.—*P. Menétriesii* is, apparently, mimicked by one of the forms of the female of the Nymphalid butterfly, *Euripus Halitherses*.

PENOA LIMBORGII (Plate 33, fig. 1, 1a, b, c, ♂ ♀).

Euplaea Limborgii, Moore, Proc. Zool. Soc. Lond. 1878, p. 823, pl. 51, fig. 2, ♂. Marshall and De Nicéville, Butt. of India, i, p. 89 (1882).

Penoa Limborgii, Moore, Proc. Zool. Soc. Lond. 1883, p. 275, pl. 30 fig. 7, ♂.

Euplaea (Penoa) Limborgii, Elwes and De Nicéville, Journ. Asiat. Soc. Bengal, 1887, p. 416.

IMAGO.—Male. Upperside. *Forewing* very dark purplish-brown, glossed with steel-blue to near the margins; with a *long sexual mark* between the lower median and submedian vein; and a few very indistinct lower marginal pale dots. *Hindwing* dark rufescent-brown towards the base and cinereous-brown along the costal border; with a prominent submarginal row of small pure-white or brownish-white oval submarginal spots, and a marginal row of small round spots. Cilia white spotted. Underside rufescent olivaceous-brown, darkest upon the discal area. *Forewing* sometimes with one or two small bluish-white costal spots, one within end of the cell, one on the disc between the middle and upper median veinlets, and a very slender spot sometimes also between the upper median and radial; a pure white oval discal spot between the middle and lower median veinlets, and a dull brown sexual streak between the lower median and submedian vein, the posterior margin being cinereous-brown; some specimens also have a complete submarginal row of seven very small white spots and a lower submarginal row, and in others only two of these submarginal spots between the medians and the two or three lower marginal spots are present. *Hindwing* with a bluish-white cell spot, a discal series of small slender and spots, a very prominent row of large oval white submarginal spots, and a marginal row of small rounded spots; some white dots also at base of the wing.

FEMALE. *Forewing* glossed with steel-blue to near the margins as in male, with the posterior margin straight; a minute white spot on the costa above end of the cell, one on the disc between the middle and upper median veinlets, and two or three small brownish-white marginal spots at the posterior angle. *Hindwing* with a very prominent row of large anteriorly decreasing oval white submarginal spots, and a marginal row of conical spots. Underside paler than in male; markings the same; forewing also with a long white streak between the lower median and submedian

vein. *Body* dark brown; head, palpi, thorax in front and beneath black, spotted with white; legs black, fore femora white streaked beneath; abdomen beneath with white segment bands and lateral spots.

Expanse, $3\frac{1}{4}$ to 4 inches.

HABITAT.—Upper and Lower Tenasserim.

DISTRIBUTION.—According to Mr. De Nicéville (Butt. of Ind. i. 89) it is “common in Upper Tenasserim from Feb. to April, and perhaps at other seasons.” Mr. Limborg (P. Z. S. 1878, 823) took it at “Ahsown, 2000 feet elevation, also above Ahsown, at Halseiga, and at the Houndguran source.” It also occurs at Tavoy (J. A. S. Beng. 1887, 416). Capt. Bingham obtained it in the Thoungyeen forests in May, and in the Mepley Valley in February. Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 30) also obtained it in the Mergui Archipelago in “Dec. and January.”

PENOA DEIONE (Plate 34, fig. 1, 1a, b, c, ♂ ♀).

Euplœa Deione, Westwood, Cabinet of Oriental Entom. p. 76, pl. 37, fig. 3, ♂ (1848). Butler, Journ.

Linn. Soc. Zool. xiv. p. 301 (1878). Marshall and De Nicéville, Butt. of India, i. p. 88 (1882).

Penœa Deione, Moore, Proc. Zool. Soc. Lond. 1883, p. 275, pl. 30, fig. 2 ♂.

Euplœa Poeyi, Felder, Reise Novara, Lep. ii. p. 340, ♀ (1867).

Euplœa magnifica, Butler, Trans. Ent. Soc. Lond. 1874, p. 423, ♀.

IMAGO.—Male. Upperside. *Forewing* very dark purplish-brown, brilliantly glossed with steel-blue to the extreme margins in certain lights; with a minute white spot on the costa above end of the cell, one within end of the cell, a more conspicuous pure-white spot on the disc between the upper and middle median veinlets, and sometimes a second discal spot between the middle and lower medians, and in some specimens the costal and cell spot is absent; a *very long, broad, sexual mark* between the lower median and submedian vein. *Hindwing* rufescent-brown, darkest and glossed with steel-blue towards the base; with traces in some specimens of an obsolete submarginal row of small oval spots, and also of a marginal row of smaller spots; costal border broadly cinerous-brown. Cilia white spotted. Underside rufescent-brown, darkest about the disc, and with a slight violaceous tint. *Forewing* with a distinct bluish-white costal spot, a cell spot, a discal spot between the middle and upper median veinlets, and a slender short streak above the upper median veinlet; a prominent white larger elongated discal spot between the middle and lower medians, a broad brown patch of modified scales between the lower median and submedian vein, the extreme posterior margin being glossy cinereous. *Hindwing* with a minute bluish-white spot within end of the cell, a discal series of five minute spots, the upper one somewhat larger; some white dots at the base; a more or less complete marginal row of small white spots, and in some specimens, a more or less complete submarginal row of small oval spots.

Female. *Forewing* differs in having the posterior margin straight; the costal spot and two discal spots, as in male, but generally larger, and sometimes also with

a small discal scaly-spot between the lower median and submedian vein. *Hindwing* paler than in male, and not blue-glossed; with more or less distinct traces of obsolescent submarginal and marginal pale spots. Underside slightly paler than in male. *Forewing* with the bluish-white costal and cell spot, the three discal spots more prominent and somewhat larger, the cell spot sometimes indentated; a prominent bluish-white lengthened streak between the median and submedian vein, and the extreme posterior margin brownish-white; submarginal and marginal lower dots, when present, white. *Hindwing* with the bluish-white small cell spot, and discal series of five or seven small spots, the upper and lowest, when present, very slender; small oval lower submarginal spots and smaller marginal spots when present, white.

Expanse, $3\frac{1}{2}$ to 4 inches.

HABITAT.—Sikkim, Buxa, Assam, Naga Hills, Silhet, Upper Burma.

DISTRIBUTION.—Obtained by the late Mr. W. S. Atkinson in Sikkim, and also by Mr. De Nicéville (J. A. S. Beng. 1883, 93) in October. Mr. Elwes (Tr. Ent. Soc. Lond. 1888, 302) notes it as “not a very rare insect in the low valleys of Sikkim from May to October.” It has also been taken at Buxa in Bhotan. Dr. G. Watt (Ann. Nat. Hist. 1885, 300) obtained it “near Assam.” Mr. J. L. Sherwill records it in his recent list from the Naga Hills. It also occurs in Silhet, and has been received from Akyab in Arakan. A specimen in Col. Swinhoe’s collection received from Mr. Noble is from Mandalay in Upper Burma.

INDO-MALAYAN ALLIED SPECIES OF *PENOA*:—*P. Pinwillii* (Butler, Trans. Linn. Soc. Zool. 1876, 535, pl. 69, fig. 9, ♂). This is a paler insect and slightly smaller than *P. Limborgii*. Forewing dark violet-brown, with but slight bluish-violet reflections in some lights, not brilliant steel-blue glossed as in *T. Limborgii*. Sexual mark also somewhat shorter and narrower. Hindwing with ill-defined brownish-white spots, the submarginal row being of a longer oval than those in the latter species. *Habitat*. Malay Peninsula, Sumatra, Nias.—*P. transpectus* (Moore, P.Z. 5, 1883, 275. *Habitat*. Billiton Island.—*P. Kheili* (Weymer, Stett. Ent. Zeit. 1865, 259, pl. i. fig. 4, ♂. *Habitat*. Nias Island.—*P. uniformis*, n. sp. Nearest to *P. Menétriesii*. Upperside differs from it in its darker violet tint of colour; sexual mark of the same size. Hindwing without any submarginal or marginal spots. Underside darker than *P. Menétriesii*; spots on the forewing smaller. Hindwing with a small cell spot and four discal spots only; no submarginal or marginal spots. Quite distinct from *P. Zonata*. Expanse $3\frac{5}{8}$ inches. *Habitat*. Labuan, Borneo (Lowe). Type in Coll. Messrs. Godman and Salvin.—*P. Zonata* (Druce, P. Z. S. 1873, 338, ♂.) *Habitat*. Borneo.—*P. Eyndhovii* (Felder, Reise Novara, Lep. ii. 338.) *Habitat*. Java.—*P. Geyeri* (Felder, Reise Nov. Lep. ii. 338.) *Habitat*. Java.

Genus TREPSICHROIS.

Trepsichrois, Hübner, Verz. bek. Schmett. p. 16 (1816). Butler, Journ. Linn. Soc. Zool. XIV. p. 296 (1878). Moore, Proc. Zool. Soc. Lond. 1883, p. 286.

Eudæmon, Dalman, Billberg's Enum. Ins. p. 76 (1820).

Euplæa (sect *B*, part) Distant, Rhop. Malayana, p. 24 (1882).

Euplæa (*Trepsichrois*), Marshall and De Nicéville, Butt. of India, i. p. 74 (1882).

IMAGO.—Male. *Forewing* elongated, triangular; apex prolonged and slightly rounded, exterior margin very oblique, uneven, somewhat concave in the middle; posterior margin very slightly convex; upper discocellular inwardly oblique, acutely bent before the lower radial and emitting a short spur within the cell from the angle. *Hindwing* short, triangular, apex and anal angle convex; with a small triangular pale ochreous-white upper-discal patch, an anterior patch of pale-brown, and a larger greyish-brown woolly apical patch, the white patch being clothed with densely packed laxly-raised broad round-tipt scales, the anterior patch with broad round-tipt ribbed scales, and the woolly patch with ordinary short round-tipt scales and with intervening long filamentous spatular-tipt scales which are so numerous as to hide those beneath.

LARVA. With four pairs of long fleshy filaments.

Type. T. Claudia.

TREPSICHOIS LINNÆI (Plate 35, fig. 1, larva and pupa, 1a, b, ♂ ♀).

Papilio Midamus (part), Linnæus, Mus. Lud. Ulricæ, p. 251 (1764). Fabricius, Syst. Ent. p. 479 (1775); Spec. Ins. II. p. 52 (1781); Ent. Syst. III. i. p. 39 (1793).

Danaïs Midama (part), Godart, Encycl. Méth. ix. p. 179 (1819).

Euplæa Midamus, Doubleday and Hewitson, D. Lep. p. 87 (1847). Moore, Catal. Lep. Mus. E. I. C. i. p. 183 (1857). Butler, Catal. Fabrician Lep. Brit. Mus. p. 2 (1869). Kirby, Catal. D. Lep. p. 15 (1871). Distant, Rhop. Malayana, p. 24, pl. 2, fig. 8, 9 ♂ ♀ (1882). Aurivillius, Kongl. Vetens. Akad. Handlingar, 1882, p. 61. Staudinger, Exot. Schmett, p. 51. pl. 25. fig. ♂ ♀ (1885).

Trepsichrois Midamus, Butler, Journ. Linn. Soc. Zool. XIV. p. 297 (1878).

Euplæa (*Trepsichrois*) *Midamus*, Marshall and De Nicéville, Butt. of India, i. p. 74, pl. 8, fig. 13, ♂ ♀ (1882).

Trepsichrois Linnæi, Moore, Proc. Zool. Soc. Lond. 1883, p. 286, pl. 29, fig. 4, ♀ *id.* pl. 30, fig. 1, ♂.

Trepsichrois Van-Decenteri, Forbes, Naturalist's Wanderings in Sumatra, &c., p. 274 (1885). Butler, Ann. and Mag. Nat. Hist. 1885, p. 300.

Ehret, Plantæ et Papilion. pl. 3 (1748), male.

Kleeman, Beitr. Nat. Insecten, i. p. 69, pl. 9, fig. 1, 2 (1792), female.

IMAGO.—Male. *Upperside*:—*Forewing* dark velvety blackish-brown, quite black in some lights; glossed with steel-blue—which is brightest on the apical half where in some lights it forms a large brilliant blue patch with sometimes a purplish tinge; a small pale blue costal spot above end of the cell, one within lower end of the cell, two inner-discal spots situated between the median veinlets, of which the lower is sometimes minute, and sometimes a third inner-discal very slender spot is present below the median; a curved outer-discal series of six spots, of which the lowest is longitudinally narrow and sometimes has a smaller contiguous spot below it; beyond is a submarginal series of spots comprised of five anterior spots and one spot (which is sometimes double) above the posterior angle;

followed by a marginal row of smaller spots; all these spots, excepting the lowest outer-discal, being more or less white centered. *Hindwing* velvety purplish-brown on the posterior half; the anterior half with a dull greyish-brown patch extending from base of the costal vein broadly through the upper part of the cell and with a woolly appearance broadly across the wing, the basal portion of the patch being clothed with broad brown round-tipt ribbed scales, the outer woolly portion with ordinary short round-tipt scales and with intervening long filamentous spatular-tipt scales which are so numerous as to hide those beneath, the extreme costal border being whitish-cinereous; a small triangular ochreous-white spot situated within the cell below the origin of the first subcostal veinlet, clothed with densely patched laxly-raised broad round tipt scales; in some specimens a marginal row of minute bluish-white dots is present, in others the marginal dots of the underside are slightly visible. *Cilia* alternated with white. Underside paler; purpurescent-brown. *Forewing* with a broad dull greyish-brown lower-discal patch divided into three portions and clothed with brown intervening white round tipt scales from which an ochreous-white lower inner streak extends above the submedian to the base, the posterior border being whitish-cinereous and clothed with narrow scales; all the spots present as on the upperside, excepting the lower outer-discal spot, but are smaller and violet-blue. *Hindwing* with generally one, sometimes two, small very slender violet-blue spots within lower end of the cell; five or six similar slender discal spots, an upper submarginal row of very small spots, and, generally, a complete marginal row of more rounded small spots. Female. Upperside brown. *Forewing* darkest and of a purplish-brown tint on the apical half; with a large subapical patch of brilliant steel-blue; the spots as in male but pure white, excepting those on the blue patch; within the cell a brownish-white slender streak extends from the base to near the white spot, and a longer, sometimes two, similar streaks extend between the lower median and submedian vein and coalesce with the lower outer discal spot. *Hindwing* with two very slender white basal streaks and two short anterior streaks within the cell, an upper inner-discal series of short slender streaks, an outer-discal series of streaks in pairs between the veins, of which the anterior pairs are short, the two lower median pairs joining the inner-discal spots, and the lower streaks extending up to the base of the wing; beyond is a complete marginal row of small white spots; costal border broadly cinereous-white. Underside uniformly brown; markings on both wings as on upperside; the cell and lower streaks of the forewing broader and more prominent, and the posterior border also broadly cinereous-white. *Body*, head, palpi, and legs black; thorax in front and beneath, head, and palpi white spotted, fore femora white beneath; abdomen beneath with broad bluish-white bands. In the female there is also a white dorsal streak and a lateral bluish-grey streak on the thorax, and the abdomen has also a lateral bluish-grey band and sublateral spots.

Expanse, $3\frac{1}{2}$ to $4\frac{1}{4}$ inches.

ADULT CATERPILLAR.—Cylindrical; with four pairs of long fleshy subdorsal filaments, which have pink bases and black tips, three pairs being on the anterior segments and the fourth pair on the 12th segment. Body pinkish-white, with lateral yellowish blotches, the segments each divided by a black line and anteriorly bordered by a transverse narrow pink band and purple-brown stripes; spiracles black; head with a dark red stripe in front and on each side; forelegs black; middle and hind legs black, ringed with pink. (Java form, *T. Claudia*.)

CHRYSLIS.—Short, thick across the middle, thorax concave behind, abdominal segments dorsally convex; metallic golden-brown with darker brown anterior stripes.

HABITAT.—N. W. and E. Himalayas; Assam; Khasia and Naga Hills; Cachar; Upper and Lower Burma. Nicobars.

HISTORICAL NOTE.—The true *P. Midamus* of Linnæus has been shown (see "Monograph of the Euploëinæ" published in Proc. Zool. Society of London, 1883, p. 312) to be a species of the genus *Isamia*, and pertaining to quite a different section in this group of butterflies—which is characterized by the possession of a *sexual mark on the forewing and a large patch on the hindwing*. Linnæus had erroneously confounded these two distinct forms [*Trepsichrois* and *Isamia*] and, in his original description (Syst. Nat. 1758, p. 470) cited Ehret's plate iii. as well as that of his plate xi., and De Geer's figure in Acta Holmiæ, 1748, pl. 6, f. 1, 2, as illustrations, and (subsequently) supplementing his description in the "Mus. Ulr." p. 251, with that of our present insect. Ehret's plate iii., however, represents a male of our present species (*P. Linnæi*), and his plate xi. a male, and De Geer's plate the female, of the true *Midamus*. Linnæus's description also agrees with these two latter figures, giving therefore all that was necessary for fixing the identity of his species. Subsequent authors, however, when referring to the Linnæan species *Midamus*, applied the name to the present and well-known common Indian insect (*T. Linnæi*), instead of to the Chinese insect unmistakably represented on Ehret's plate xi. and on De Geer's plate 6. The distinctive characters of the Linnæan *Midamus* are very correctly given by Dr. Zinken-Sommer, Nova Acta Acad. Nat. Cur. 1831, p. 190, in his remarks upon the *Euploea Pavette*.

METAMORPHOSES OF TREPSICHOIS.—We know only those of the Java form, *T. Claudia*, the larva of which was discovered by the late Dr. Horsfield, "feeding on a species of Ficus," and from whose drawings our description and figures are taken. In Semper's "Reisen Archipel. Philippen," plate A, fig. 3, 3a, the larva and pupa of the allied *T. Diocletia*, are also figured.

DISTRIBUTION WITHIN INDIAN AREA.—The range of *T. Linnæi* extends from the North West, through the Himalayas to Burma. According to Col. Lang (P. Z. S. 1865, 494) it appears to be rare in the N. W. Himalayas, a single specimen only being obtained in a valley of the Simla district. Mr. A. G. Young also obtained only

a single example in Kulu. In Kumaon, Mr. W. Doherty (J. Asiat. Soc. Beng. 1886, 114) found it "common in the Kali valley to Dharchula, Gori, and Sarju valleys 2—4000 feet." Mr. De Nicéville says (Butt. Ind. i. 75) that "in Kumaon it is found but rarely in the warm valleys during the rains," and that "he took a single specimen at Kalka in the Punjab, in October." Col. Lang also records the capture of a specimen "at Sitapur" in the plains of Oudh (Ent. Mo. Mag. 1864, 104). In Nepal it appears to be common near Khatmandu, as both Gen. G. Ramsay and Dr. Scully obtained numerous specimens. Mr. De Nicéville (Butt. Ind. i. 75) "took it commonly in the Sikkim Terai, and below Darjiling in the autumn." In the Ranjit Valley 1200 to 3500 feet elevation, it was obtained in November. Mr. J. H. Elwes (Tr. Ent. Soc. 1888, 301, says it is "common in Sikkim up to 6000 or 7000 feet from April to December." Dr. G. Watt (Ann. Nat. Hist. 1885, 301) obtained it on the borders of Assam. It also occurs at Sibsagar. Mr. J. L. Sherwill recently obtained it on the Naga Hills. "In the Khasia Hills, it is common in the autumn and cold weather" (Butt. Ind. i. 75). Mr. J. Wood-Mason records it (J. A. S. Beng. 1887, 345) as "common during the hot weather (March to October) in Cachar, and on Nemotha Peak, 3634 feet elevation" (J. A. S. Beng. 1887, 345). In Burma, it has been taken at Mandalay; Rangoon in December; and Moulmein in October. In Upper Tennasserim Mr. O. Limborg (P. Z. S. 1878, 823) obtained it during the cold weather at "Ahsown 2000 feet, from Moulmein to Meetan, at Hatsiega, HOUNGDURAN, and from Nathoung to Paboga," and Capt. Bingham "found it common in the Thoungyeen forests in March and April." Mr. Elwes records (J. A. S. Beng. 1887, 416) several specimens from "Tavoy and hills on Siam frontier." Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 31) found it common in the Mergui Archipelago from November to March. Mr. Doherty records (J. A. S. Beng. 1886, 256) the capture of a single specimen of the female at Bompoka on Pahat in the Nicobar Islands.

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. E. L. Layard obtained it at Chentaboon, a mountainous district 200 miles from Bangkok on the east coast of the Gulf of Siam (P. Z. S. 1874, 103). It is also recorded from Camboja. Mr. H. E. Hobson (P. Z. S. 1877, 810) obtained it in Formosa. In the Malay Peninsula, Mr. Distant (Rhop. Malayana, 24) records it from Malacca, Province Wellesley, and from Pinang. It also occurs in Singapore, Salanga, and Sumatra (those from the latter place forming the type of Forbes' *T. Vanderwenteri*.)

PARASITE OF *T. LINNÆI*.—In the Proc. of the Entom. Soc. of London, vol. ii. (1836), p. vi. plate 2, figs. 9, 10, a species of Chalcis, namely, *C. (Brachymeria) euploææ*, is described and figured by Westwood as being "parasitic upon the pupæ of an East Indian Euploæa,—received by the Rev. F. W. Hope,—twenty-one specimens of which emerged from one chrysalis." From the figure given of the chrysalis here referred to, it evidently belongs to the present species. This species of *Brachymeria*

is also recorded by Mr E. C. Cotes, in "Notes on Indian Insect Pests," 1889, p. 32, as being parasitic on a Liparid Moth, referred to, by him, as *Dasychira Thwaitesii*.

TREPSICHOIS KALINGA.

Euplea (Tropsichrois) Kalinga, Doherty, Journ. Asiatic Soc. Bengal, 1886, p. 256.

IMAGO.—"Male. Differs from the male of *Linnæi* only in the less brilliant blue of the forewing, with its spots larger and more distinctly white; and in the smaller male patch of the hindwing, extending neither to the apex of the cell nor to the lower median branch. Female, almost indistinguishable from the male, except in the absence of the male patch and the presence of a line of obscure whitish submarginal dots on the hindwing. A few paler streaks are usually visible on the disc of the hindwing subapically, but the cell is in all my specimens immaculate, a character in which it differs from all its allies."

HABITAT.—Ganjam District, E. Coast, Madras.

DISTRIBUTION.—Mr. W. Doherty (l. c. p. 256) says, "I found this butterfly common on Mahendragiri and other mountains of the Ganjam District, and in the Potinga Pass, and the neighbouring country in the Vizagapatana District, Madras Presidency, and in the adjoining native State of Jaipur. I also saw a specimen flying in Orissa, near the southern boundary of that Province. It probably represents *T. Midamus* throughout the main line of the Eastern Ghâts from the river Godâvari to the Mahânadi."

MIMICKS of Indian species of *Tropsichrois*:—Of the group *Limnaina*, the *Tirumala septentrionis* has a superficial resemblance to the female of *T. Linnæi*.—Both sexes of a species of the subfamily *Elymniinæ*, namely *Elymnius leucocyma*, are, respectively, excellent mimicks of the sexes of *T. Linnæi*. This butterfly is also mimicked by the day-flying Moths of the family *Chalcosiidæ*, namely *Amesia Aliris*, the males of which resemble the same sex of *T. Linnæi*, and by *Amesia Midama*, both sexes of which respectively mimick the male and female of *T. Linnæi*.

INDO-MALAYAN ALLIED SPECIES OF TREPSICHOIS.—*T. Claudia* (Fabr.—Herbst., Nat. Schmett. pl. 120, fig. 5, *Syn.* *P. basilissa*, Cram. Pap. Exot. pl. 266, f. C, ♀), of which the larva and pupa are figured in Horsfield's Catal. Lep. Mus. E. I. C. (1828), pl. 3, fig. 10, 10a. *Habitat.* Java.—*T. Mulciber* (Gram. pl. 127, fig. C, D); also described and figured in Distant's "Rhop. Malayana," p. 25, pl. 3, fig. 1, 2, ♂ ♀. *Habitat.* Borneo; Billiton; Malay Peninsula.—*T. Verhuelli* (Moore, P. Z. S. 1883, p. 287, ♀); the male of which is described and figured in Kheil's "Rhopalocera der Insel Nias," p. 18, pl. 1, fig. 5. *Habitat.* Island of Nias, W. Coast of Sumatra.—*T. paupera* (Staudinger)—*Habitat.* Island of Palawan.—*T. Diocletia* (Hübner, Exot. Schmett. iii. pl. fig. 3, 4. *Syn.* *E. Megilla*, Erichson, Nova Acta, pl. 50, fig. 7), of which the larva, pupa, and both sexes of imago are described and figured in Semper's "Reisen Archipel. Philippen," p. 24, pl. A, fig. 3, 3a, pl. 5, fig. 3 ♀. *Habitat.*

Luzon, Philippines.—*T. Tisiphone* (Butler, P. Z. S. 1866, p. 274, ♂, *Syn.* E. Semperi, Felder), also described and figured by Semper, *l.c.* p. 26, pl. 5, fig. 1, ♂. *Habitat.* Mindoro, Philippines.—*T. Kochi* (Moore, P. Z. S. 1883, p. 288), described and figured by Semper, *l.c.* p. 27, pl. 5, fig. 6, ♂. *Habitat.* Negros and Guimaras, Philippines.—*T. Visaya* (Semper, *l.c.* p. 27, pl. 5, fig. 2, 3, ♂ ♀. *Habitat.* Samar, Leyte, Bohol, Philippines.—*T. Mindanaoensis* (Semper, *l.c.* p. 28, pl. 5, fig. 4, 5, ♂ ♀). *Habitat.* Mindanao, Philippines.

Genus CALLIPLÆA.

Calliplæa, Butler, Trans. Ent. Soc. Lond. 1875, p. 1. Moore, Proc. Zool. Soc. Lond. 1883, p. 292.

Euplæa (Sect. B, part), Distant, Rhop. Malayana, p. 26 (1882).

Euplæa (*Calliplæa*), Marshall and De Nicéville, Butt. of India, i. p. 73 (1882).

IMAGO.—Wings small, short, broad. MALE. *Forewing* somewhat quadrate, posterior margin convex in the middle and thence very oblique to the base; cell broad, upper discocellular bent near each end, lower outwardly oblique, inner spur obsolete. *Hindwing* with a pale ochreous oval upper-discal patch, which is clothed with densely packed laxly raised overlapping round-tipt scales.

Type.—C. Darchia.

CALLIPLÆA LEDERERI (Plate 36, fig. 1, 1a, b, c, ♂ ♀).

Euplæa Ledereri, Felder, Wien. Entom. Monats. iv. p. 397 (1860); *id.* Reise Novara, Lep. ii. p. 317, pl. 40, fig. 5, 6, ♂ (1867). Distant, Rhop. Malayana, p. 26, pl. 2, fig. 10, ♂ (1882).

Calliplæa Ledereri, Butler, Trans. Linn. Soc. Zool. 1877, p. 536; *id.* Journ. Linn. Soc. Zool. xiv. p. 295 (1878). Moore, Proc. Zool. Soc. Lond. 1883, p. 292.

Euplæa (*Calliplæa*) *Ledereri*, Marshall and De Nicéville, Butt. of India, i. p. 73 (1882).

Euplæa inquinata, Butler, Proc. Zool. Soc. Lond. 1866, p. 291, fig. 2, ♂.

IMAGO.—Male. Upperside. *Forewing* with the basal half violaceous fuliginous-brown, the anterior half darker, almost black and with dark blue reflections more or less brilliant in certain lights; a very small violet-blue spot at lower end of the cell, one on the costa above end of the cell, another below the base of third subcostal branch, all three of which are sometimes absent; a very small slender discal spot above the upper median veinlet, followed by a submarginal row of six spots, of which the four lower are small but of equal size, the two upper being larger and oval, all the latter being white centred. *Hindwing* paler, and more of an olivescence-brown, the costal border broadly glossy cinereous-white; with a broad upper-discal pale ochreous patch clothed with densely packed laxly raised overlapping round-tipt scales; a submarginal upper row of four whitish spots of which the two lower are very minute and indistinct. Cilia white spotted. Underside uniformly dark fuliginous-brown. *Forewing* with the posterior border cinereous, and an ochreous patch above the submedian vein which is clothed with densely packed laxly raised overlapping narrow round-tipt scales; marked as upperside, the spots being white and more distinct, the upper submarginal spots of small size; in addition there is also a lower

marginal row of very minute spots, and a larger inner-discal spot above the lower median veinlet. *Hindwing* with a submarginal row of prominent small white spots decreasing to dots towards the anal angle, and a lower marginal row of dots; some white spots at base of the wing. *Thorax*, head and palpi black, spotted with white; legs black, fore femora beneath white streaked; abdomen above dark brown, beneath black, banded with white.

FEMALE. Upperside paler; the base and hindwing more olivescence-brown. *Forewing* blue-glossed and with somewhat larger blue spots, as in male. *Hindwing* with the costal border cinereous-white, the two upper submarginal whitish spots sometimes only present, the others, and the marginal dots of the underside sometimes visible from above. Underside of the same colour, and marked, as in male.

Expanse, ♂ $2\frac{3}{4}$, ♀ 3 to $3\frac{1}{4}$ inches.

HABITAT.—Lower Burma.

DISTRIBUTION WITHIN INDIAN AREA.—A male and female in the collection of Messrs. Godman and Salvin (and formerly in the possession of Mr. H. Druce) was received from Mr. Hume, and obtained at Bankasoon in the Lower Burma Hills.

DISTRIBUTION OUTSIDE INDIAN AREA.—Occurs in the "Malay Peninsula at Province Wellesley, Perak, and Malacca" (Distant, Rhop. Malay, p. 26). Mr. Carl Bock obtained it in Sumatra.

INDO-MALAYAN ALLIED SPECIES OF CALLIPLÆA.—*C. Mazares* (Moore, Catal. Lep. Mus. E. I. C. i. p. 128, 1857). *Habitat*. Java.—*C. Aristotelis* (Moore, Proc. Zool. Soc. 1883, p. 292). *Habitat*. N. Borneo.—*C. Mariestis* (Moore, *id.* p. 293). *Habitat*. Kinkiang, N. China.—*C. pollita* (Erichson, Nova Acta Acad. N. C. 1834, p. 282, pl. 50. f. 6). Also described by Semper, Reisen Archipel. Philippen, Lep. p. 30 (1886). *Habitat*. Philippines.—*C. monilis* (Moore, *id.* p. 293). Also described and figured in Semper's Reisen Archipel. Philippen, Lep. p. 29, pl. 6, f. 4, 5, ♂ ♀. *Habitat*. Mindanao, Philippines.—*C. Hainana* (Holland, Trans. Amer. Ent. Soc. 1887, p. 112, pl. 1, fig. 2). *Habitat*. Hainan. About twenty other species have been described (see Proc. Zool. Soc. Lond. 1883, pp. 293–6), which inhabit the Austro-Malayan islands of Gilolo, Waigiou, Mysol, Timor, New Guinea, Dorey, Aru, N. Australia, Loyalty, New Caledonia, and the Fiji Islands.

Genus EUPLÆA.

Euplæa, Fabricius, Illiger's Magazine, vi. p. 280 (1807). Moore, Proc. Zool. Soc. Lond. 1883, p. 288.

Macropylæa, Butler, Journ. Linn. Soc. Zool. xiv. p. 292 (1878). Moore, Lep. of Ceylon, i. p. 9 (1880).

Euplæa (Sect. *B*, part), Distant, Rhopalocera Malayana, p. 24 (1882).

Euplæa (*Macropylæa*), Marshall and De Nicéville, Butt. of India, i. p. 71 (1882).

IMAGO.—Wings very large and broad. Male. *Forewing* somewhat elongated, quadrate; apex rather acuminate, exterior margin oblique, posterior angle rounded, posterior margin very convex in the middle; cell very large and broad; discocellulars concave, discoidal spur obsolete; lower median veinlet and the submedian vein

extremely wide apart. *Hindwing* triangular; the costal margin long, apex somewhat angularly convex, exterior margin very oblique and convex anteriorly; cell extremely long, with a large oval ochreous upper-discal patch extending from near the base and above the subcostal to near end of cell, clothed with densely packed broad round-tipt ribbed scales; antennæ rather thick, with imperceptibly increased tip.

LARVA with three pairs of fleshy filaments.

Type.—*E. Corus*, Fabricius.

HISTORICAL NOTE.—The genus *Euplœa*, as established by Fabricius (Illiger's Mag. 1807, p. 280), consisted of three species—*Plexippus*, *Similis*, and *Corus*—the two first named species belonging to the group *Limnaina*. *Plexippus* became the type of Latreille's genus *DANAIDA* in 1805, and *Similis* that of the genus *Radena* in 1880, thus leaving *Corus* as the remaining species, and consequently the type, as specified in the 'Monograph of the Euplœinæ' in Proc. Zool. Soc. Lond. 1883, p. 289. This late period in the determination of the type of *Euplœa* had been caused by an erroneous identification, by Hübner (Verz. p. 16), Doubleday (Gen. D. Lep. p. 88), Kirby (Syn. Catal. p. 10), Scudder (Historical Sketch of generic names of Butterflies, p. 172), Butler (J. Linn. Soc. 1878, p. 291), and Moore (Lep. Ceyl. i. p. 11); each of these authors, in the works cited, having taken the *Corus* of Fabricius to be the same species as the *Core* of Cramer (Pap. Exot. iii. pl. 266, fig. E, F). Both Mr. Scudder (*l.c.*) and Mr. Butler (*l.c.*) citing Cramer's *Core* as the typical representative of the Fabrician genus *Euplœa*. This erroneous identification I also followed in the "Lep. of Ceylon," p. 11. Subsequently, on going more fully into the study of the entire group of Euplœinæ (see Monograph in P. Z. S. 1883), and then finding that Mr. Butler (Catal. Fabrician Lepidoptera, p. 1) had, in 1869, stated the *E. Corus* of Fabricius to be a "local form of the *E. phænareta*," and "has evidently no connection with the *Core* of Cramer," and that this important fact had been overlooked in his subsequent revision of the group published in the Linnean Journal in 1878. On comparing the descriptions of these two species their distinction was at once seen,—*Corus* being then identified as the female of the Ceylon form named *Elisa*, and pertaining to a different section of the group from that in which *Core* has been placed.

EUPLÆA CORUS (Plate 37, fig. 1, larva and pupa, 1a, b, ♂ ♀).

Papilio Corus, Fabricius, Ent. Syst. iii. p. 41 (1793), ♀.

Euplœa. Corus, Fabricius, Illiger's Mag. vi. p. 280 (1807). Moore, Proc. Zool. Soc. Lond. 1883, p. 289.

Danaïs Cora, Godart, Enc. Méth. ix. p. 178 (1819).

Euplœa Elisa, Butler, Proc. Zool. Soc. Lond. 1866, p. 270.

Macrophlœa Elisa, Butler, Journ. Linn. Soc. Zool. xiv. p. 292 (1878). Moore, Lep. of Ceylon, i. p. 9, pl. 5, fig. 2, 2a, ♂ ♀ (1880).

Euplœa (Macrophlœa) Elisa, Marshall and De Nicéville, Butt. of India, i. p. 72, pl. 8, fig. 14, ♂ (1882).

IMAGO.—Male. Upperside dark golden olivaceous-brown. Forewing dusky-brown

along posterior margin; with a small brownish-white spot within lower end of the cell, a discal series of three spots, a recurved submarginal row, and a marginal row of smaller spots. *Hindwing* darker brown exteriorly, anterior margin ochreous-white, anal margin sullied, as if oiled (which appearance is given by long, pointed, closely-striated black glossy scales which thickly overlap the ordinary short scales); with a *large upper-discoidal ochreous patch* clothed with densely packed broad round-tipt ribbed scales; the costal border exteriorly cinereous-white, clothed with smaller narrow and less compactly disposed similar scales; five small brownish-white discal spots, an anterior submarginal and marginal row of small white spots. Female. Upside uniformly paler, and more olivescient in tint, with all the spots on both wings as in male, but ochreous-white and less prominent, the two marginal rows on the hindwing mostly complete. Underside duller coloured, more dusky towards the base; the cell and discal spots on both wings violet-white and more prominent; on the hindwing the discal series is composed of eight spots which extend from the costal to the abdominal border, and the two marginal rows extend to the anal angle; posterior border of the forewing broadly ochreous-white, its upper inner end across the submedian in the male, being darker ochreous and clothed with densely packed broad round-tipt scales. Head, thorax in front and beneath, and palpi black, spotted with white; legs black; thorax above dark-brown with a dorsal white streak; abdomen dark brown.

Expanse, ♂ $4\frac{1}{4}$, ♀ $4\frac{1}{2}$ inches.

ADULT CATERPILLAR.—Cylindrical; purple-brown; with a pair of black-tipt red fleshy filaments on the 3rd, 4th, and 12th segments; each of the segments with transverse darker brown streaks; lateral line paler; head and legs darker purple-brown.

CHRYSALIS.—Broad, thorax above oblique, uneven, abdominal segments dorsally convex; purplish silvery-grey, fasciated with golden-brown; abdominal segments brown-spotted.

HABITAT.—Ceylon.

The larva and pupa of *E. Corus* figured on our Plate 37, fig. 1, are copied from the drawings made by Mr. E. L. Layard in Ceylon, and were erroneously figured in the Catalogue of the Lepidoptera in Mus. E. I. Company, vol. i. pl. 4, figs. 8, 8a (1857), as those of *E. Prothoe*.

HABITS OF IMAGO.—According to Capt. Hutchison (Lep. Ceyl. i. 12) "Occurs on low ground at Colombo among hedges round the native gardens at any time, but not very common. Of slow heavy flight; settles on leaves and easily caught." Capt. Wade (*id.* p. 12) "found it commonly at Galle, among cocoanut trees and low bushes;" and Mr. F. M. Mackwood writes that it is "a low country butterfly, being generally found near the sea or Mangrove swamps."

EUPLEA PHÆBUS (Plate 38, fig. 1, 1a, ♂ ♀).

Euplea Phæbus, Butler, Proc. Zool. Soc. Lond. 1866, p. 270. Moore, P. Z. S. Lond. 1883, p. 289.

Macropilea Phæbus, Butler, Journ. Linn. Soc. Zool. xiv. p. 292 (1878).

Euplea Castelnau, Felder, Reise Novara, Lep. ii. p. 315, ♀ (1867). Distant, Rhop. Malayana, p. 24, pl. 2, fig. 6, ♀ (1882).

Euplea (Macropilea) Castelnau, Marshall and De Nicéville, Butt. of India, i. p. 72 (1882).

IMAGO.—Male. Upperside. *Forewing* golden olivaceous-brown, darkest and of a purplish-violet tint posteriorly; with a small violet-speckled whitish spot within lower end of the cell, a discal row of eight narrow spots curving from and including the spot on the costa above end of the cell, followed by a submarginal row of nine larger spots, and a marginal row of small narrow spots, those of the discal and submarginal rows increasing in size from between the upper median veinlet and the subcostal vein. *Hindwing* darker coloured, purplish-violet; anal border sullied, as if oiled; costal border broadly cinereous-white; with a large ochreous upper-discal patch; a curved medial-discal series of four purplish-white spots, and an upper submarginal and marginal row of prominent violet-white spots, the upper spot of the submarginal row coalescing with the pale costal border. *Cilia* very slightly white spotted. Underside slightly paler. *Forewing* with the lower discal area darker purplish violet-brown; the posterior border from above the submedian to the extreme margin cinereous-white, its upper middle area being ochreous; the violet-white cell spot and three exterior rows as on upperside, all being smaller except the cell spot and those between the upper and lower median veinlets. *Hindwing* with a discal series of small violet-white narrow spots, an upper submarginal row, and a complete marginal row of very minute white spots. Female. Upperside paler. *Forewing* with all the violet-white spots larger, more diffused, and less prominently defined; in some specimens the apical area is powdered with violet-white scales and the anterior spots of the two inner rows lost in this ground colour. *Hindwing* also with three series of violet-white spots, both the submarginal and marginal row being complete to the anal angle, and with generally five in the discal row. Underside also paler. *Forewing* with the spots clearly defined, but smaller, except the cell spot and three lower discal, which are larger; posterior border broadly brownish-cinereous. *Hindwing* also with the spots smaller, the discal series being composed of seven or eight, the two of which between the median and submedian vein being very narrow. *Body* dark purplish-brown; thorax in front and beneath, head, and palpi black, spotted with white; a dorsal white streak on thorax; legs black, fore femora beneath white streaked.

Expanse, $4\frac{3}{4}$ to $5\frac{1}{4}$ inches.

HABITAT.—Lower Burma (Tenasserim); Nicobars.

DISTRIBUTION WITHIN INDIAN AREA.—It has been "taken by Capt. C. H. E. Adamson at Nyounting near Moulmein, in September" (Butt. Ind. i. 72). Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 31) obtained several specimens "on Sullivan and

Elphinstone Islands in the Mergui Archipelago, in January and March." Two males are recorded (Butt. Ind. i. 72) from the Nicobars; obtained by Mr. F. A. De Roëpstorff.

DISTRIBUTION OUTSIDE INDIAN AREA.—The type specimen described by Mr. Butler was from Penang. That described by Dr. Felder from the Malay Peninsula. Mr. Distant (Rhop. Malay. 24) also records it from Malacca, Province Wellesley, and Penang.

INDO-MALAYAN ALLIED SPECIES OF EUPLEA.—*E. Drucei* (Moore, P. Z. S. 1883, 290). Male. Comparatively larger than *E. Phœbus*; of a brighter purplish-brown tint; forewing longer and broader, marginal spots more slender, submarginal spots also smaller, the discal series more slender and indistinct; cell spot also indistinct; hindwing with all the spots smaller. Exp., ♂ 4½, ♀ 5¼ inches. *Habitat.* Chentaboon, Siam.—*E. grandis* (Moore, P. Z. S. 1883, p. 290). Male. Allied to *E. Drucei*; forewing comparatively longer and narrower, with the discal spots narrow, elongated, and distinct, submarginal row composed of very small dentate spots, the marginal spots minute and almost obsolete; hindwing with three upper series of spots, the discal series largest. *Habitat.* [Unknown.]—*E. Phæretena* (Kheil, Rhop. Insel Nias, p. 16, pl. i. fig. 1, ♀, 1884). Closely allied, if not identical with *E. Phœbus*. *Habitat.* Island of Nias.—*E. Gyllenhali* (Lucas, Rev. Zool. 1853, 316, ♂). The type specimen in the Paris Museum, which I examined, through the kindness of Mons. C. Oberthür, is closely allied to both *E. Corus* and to *E. Phœbus*, but it differs in having comparatively narrower wings, the markings above approaching more to those of *E. Phœbus*. *Habitat.* Java.—*E. Pavetta* (Zinken-Sommer, Nova Acta Akad. Nat. Cur. xv. 189 (1831). *Habitat.* Java.—*E. Butleri* (Moore, P. Z. S. 1883, 290 ♂, ♀). Smaller than *E. Phœbus*. *Habitat.* Borneo (Lowe).—*E. Godmani* (Moore, P. Z. S. 1883, 291). Male and female larger and paler in colour than *E. Butleri*. *Habitat.* Sandakan, N. Borneo.

Genus DANISEPA.

Danisepa, Moore, Proc. Zool. Soc. Lond. 1883, p. 296.

Euplea (Sect. B, part), Distant, Rhop. Malayana, p. 28 (1882).

Euplea (*Salpinx* Sect. C, part), Marshall and De Nicéville, Butt. of India, i. p. 59 (1882).

IMAGO.—Male with a narrow, lengthened-triangular forewing, the apex convex, the posterior margin lengthened and but very slightly convex; first subcostal branch free of the costal; discocellulars recurved; cell long; submedian vein recurved and running near the margin; with a short broad blue sexual streak (which is not reticulated in its general appearance) between the lower median and submedian vein, composed of broad rounded serrated-tipt scales. On the underside the sexual streak is composed of rather long, narrow, pointed, laxly disposed brown scales, with numerous intervening very slender white scales and many thread-like white scales of the same length; the posterior border being covered with widely-separated narrow scales. Hindwing lengthened, broad; anterior

margin almost straight, apex and posterior margin very convex; with a short broad upper discoidal ochreous patch, which is composed of very numerous but laxly disposed rather long narrow tapering round-tipt scales, the broad costal margin being clothed also with rather long narrow, pointed, but thinly disposed scales.

Type.—D. Rhadamanthus.

DANISEPA RAMSAYI (Plate 39, fig. 1, 1a, ♂ ♀).

Salpinx Rhadamanthus, Butler, Journ. Linn. Soc. Zool. xiv. p. 294 (1878), *nec* Fabricius.

Eupleea (Salpinx) Rhadamanthus, Marshall and De Nicéville, Butt. of India, i. plate 7, fig. 11, ♂ ♀ (1882). Elwes, Trans. Ent. Soc. Lond. 1888, p. 301.

Danisepea Rhadamanthus, Moore, P. Z. S. 1883, p. 296.

IMAGO.—Male. Upperside dark indigo-blue black, tinged with brown at the base, brilliantly glossed with dark blue in certain lights. *Forewing* with a broad white bar extending from middle of the costa across but within end of the cell, the bar being traversed by the black costal and subcostal veins; a contiguous large discal spot between the base of upper and middle median veinlets, sometimes a slender spot above the upper median, in others an outwardly-oblique more or less slender, or occasionally a broken discal spot also between the middle and lower median veinlets; beyond is a submarginal upper and lower series of white-centred pale blue spots, of which the upper series consist of four or five small spots, and the lower series of a much larger spot between the middle and lower medians and two very minute posterior spots, followed by a more or less incomplete marginal row of very small blue spots; a short, broad, pale blue sexual mark between the median and submedian veins, clothed with broad rounded serrated-tipt scales. *Hindwing* with six white streaks below the cell descending from the base between the veins and decreasing in length from the anal angle upward to the disc, beyond which are sometimes two slender blue upper discal streaks, and sometimes a white streak extends more or less slenderly within lower edge of the cell and is there tipt by one, or two, small blue points within end of the cell; beyond is a submarginal generally complete row of small white-centred pale blue spots, and a lower marginal row of smaller spots, the upper spot of the former series being between the costal and subcostal and entirely white; costal border glossy cinereous; upper discal area brown, with a medial upper-discoidal pale ochreous patch, which is clothed with very numerous laxly disposed tapering round-tipt scales, and a similar coloured streak above the costal vein. Underside more or less dark purplish-brown, markings similar to those on upperside, but whiter. On the *forewing* the lower discal spot is always present and of large size; the posterior border is broadly glossy cinereous-brown, with a broad basal ochreous patch; the sexual streak brown, clothed with rather long, narrow, pointed, laxly disposed brown scales, with intervening very slender white scales, and many thread-like white scales. *Hindwing* with the white streaks well defined, the upper discal series extending to the costa, of which the upper one is either large or small, the next very slender or some-

times absent; in the cell are two short upper white streaks, a middle streak, and a lower streak, the tips of the two latter sometimes confluent. Some white spots at base of the wing. *Cilia* alternated with white. *Body* black; thorax in front and beneath, head and palpi white spotted; a dorsal streak on thorax and femora beneath white; abdomen with lateral and broad lower segmental pale blue bands. Female. Upperside paler, browner in tint, blue glossed externally. Both wings with all the markings larger, whiter, and more prominent. On the *forewing* the lower discal spot is also larger, with its anterior edge concave and its posterior edge convex. On the *hindwing* the upper discal spots are white and prominent, and within the cell are three white streaks, the upper one shortest and sometimes broken, and each sometimes confluent at the tips; costal border glossy-cinereous. Underside paler brown, marked as upperside; the marginal markings violaceous-white. *Forewing* with the posterior border broadly brownish-white, the lower discal spot large and quadrate. *Hindwing* with the upper discal markings broader and larger.

Expanse, $3\frac{1}{4}$ to $3\frac{3}{4}$ inches.

HABITAT.—Eastern Himalayas.

DISTRIBUTION.—It was obtained in Nepal by Gen. G. Ramsay. Mr. De Nicéville captured "a single male in Sikkim at 2000 feet elevation, in October" (J. A. S. Beng. 1881, 55). According to Mr. Elwes (Tr. Ent. Soc. 1888, 301) it is "a common species in Sikkim up to about 3000 feet, from April to December." A female is in Col. Swinhoe's Collection, taken in the Great Runjit Valley in October; and a male labelled Assam, which latter locality may, however, be incorrect.

DANISEPA RHADAMANTHUS (Plate 39, fig. 2, 2a, b, ♂ ♀).

Papilio Rhadamanthus, Fabricius, Ent. Syst. iii. p. 42, ♂ (1793).

Papilio Diocletianus, Fabricius, Ent. Syst. iii. p. 40, ♀, (1793). Jones, Icones, pl. 45, fig. 2.

Danaüs Rhadamia et Diocletia, Godart, Enc. Méth. ix. pp. 180-1 (1819).

Euplœa Diocletianus, Butler, Catal. Fabr. Lep. Brit. Mus. p. 2, ♂ ♀ (1869). Distant, Rhop. Malayana, p. 28: pl. 4, fig. 4, 5, ♂ ♀ (1882).

Salpinx Diocletianus, Butler, Journ. Linn. Soc. Zool. xiv. p. 294 (1878); *id.* Trans. Linn. Soc. Zool. 1877-79, p. 535.

Euplœa (Salpinx) Diocletianus (et *Rhadamanthus*, part), Marshall and De Nicéville, Butt. of India, i, pp. 70, 71 (1882).

Danisepa Diocletianus, Moore, Proc. Zool. Soc. Lond. 1883, p. 296.

Euplœa Rhadamanthus, Staudinger, Exot. Schmett. p. 53, pl. 26, ♂ (1885).

IMAGO.—Male. Upperside dark indigo-blue black and brilliantly glossed with blue in certain lights, as in *D. Ramsayi*. *Forewing* with a somewhat narrower white costal band across end of the cell, the white discal spots either absent, or sometimes one, in others two small spots being present between the median veinlets, the submarginal spots generally entirely blue, and the lower small spots absent, the

small marginal spots also either entirely absent or only two or three of the lower present. *Hindwing* with four, sometimes five, shorter white streaks below the cell, the fifth generally being minute, these white streaks being sharply pointed at the end and much narrower than in *D. Ramsayi*, and are followed by one or two very small blue discal spots; of the submarginal spots the two between the subcostal and upper median, and two or three from the anal angle only, and three or four of the lower marginal, are generally present; the ochreous costal streak, present in *D. Ramsayi*, is absent. Underside paler; with similar markings as on upperside. *Forewing* with the two outer rows of spots smaller, whiter, with one or two of the discal spots of larger size, the lower one being present on specimens which have neither on the upperside. *Hindwing* with the white streaks below the cell, the discal streaks, and those within the cell, much narrower, and shorter than in *D. Ramsayi*, the outer rows of spots also smaller. Female. Similar to *D. Ramsayi*; browner in tint and less blue glossed, markings of *forewing* somewhat smaller, those of the *hindwing* also smaller, the streaks from the base, below and within the cell, shorter and narrower, on both the upper and underside.

Expanse, ♂ ♀ $2\frac{3}{4}$ to $3\frac{1}{4}$.

HABITAT.—Khasia and Naga Hills; Cachar; Lower Burma; Malay Peninsula; Sumatra.

DISTRIBUTION.—This species is presumably referred to by Messrs. Wood-Mason and De Nicéville (J. A. S. Beng. 1887, 346) as being "common in Cachar from April to August; the eversible caudal rosettes of the males are finely vanilla scented." A specimen of a male from the Khasia Hills, agreeing entirely with Lower Burmese examples, is in my own collection. It is also noted in Mr. J. L. Sherwill's recent list of Naga Hill butterflies. In Upper Tenasserim, Mr. O. Limborg obtained it in "December at Ahsown 2000 feet, Meetan 3000 feet, Hatseiga, and Houngduran Source, and from Naththoung to Paboga" (P. Z. S. 1878, 822). Capt. Bingham also found it "common between Meeawuddy and Kankarit in February, in the Thoungyeen forests in March and April, and in the Donat Range in April, and a single female also was taken in the Thoungyeen forests in the autumn." (Butt. of India, i. 70). Specimens have also been taken in Tavoy (J. A. S. Beng. 1887, 415). Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 31) obtained it in the Mergui Archipelago in March.

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant (Rhop. Malay. p. 28) records it from Province Wellesley, Malacca, Perak, Penang, Singapore, and Sumatra. It is also doubtfully recorded from Cochin China.

INDO-MALAYAN ALLIED SPECIES OF DANISEPA.—*D. Alcidice*, Godart (= Thoosa, Hübner, Samm. Exot. Schmett. ii. pl. 8, ♂). A smaller species than *D. Rhodamanthus*; the male having three short white streaks below the cell on the hindwing. Exp. $2\frac{1}{2}$ inches. *Habitat*. Java.—*D. Lowei* (Butler, Journ. Linn. Soc. Zool. xiv.

294, 1878). Male. Comparatively smaller than *D. Rhadamanthus*; forewing with much narrower white costal bar; hindwing with three very short white streaks below the cell. Female uniformly brown; with very white streaks below the cell of the hindwing. *Habitat.* Borneo.—*D. Shreiberi* (Butler, Ann. Nat. Hist. 1884, 403. = *D. Maasseni*, Weymer, Stett. Ent. Zeit. 1885, 260. pl. 1, fig. 3, ♂, = *F. Niasica*, Snellen). A small species, characterized by the absence of the white streaks below the cell of the hindwing. *Habitat.* Borneo; Nias.

MIMICKS OF DANISEPA.—One of the polymorphic forms (*Isa*) of the female of *Euripus Halitherses* is a striking mimick of the female *D. Rhadamanthus*. The *Papilio Caunus*, var. *Danisepa* has also a similar resemblance to the same species.

Genus SALPINX.

Salpinx, Hübner, Verz. bek. Schmett. p. 17 (1816). Butler, Journ. Linn. Soc. Zool. xiv. p. 292 (1878).

Moore, Proc. Zool. Soc. Lond. 1883, p. 300.

Euplœa (Sect. *B*, part), Distant, Rhop. Malayana, p. 26 (1882).

Euplœa (*Salpinx*, Sect. *C*, part), Marshall and De Nicéville, Butt. of India, i. p. 59 (1882).

IMAGO.—Male. Wings short. *Forewing* very broad, quadrate, apex acuminate, exterior margin slightly oblique and convex, posterior margin acuminate at the angle and very convex in the middle; cell broad, short; with a short broad blue streak between the lower median and submedian vein, composed of the broad rounded but slightly serrate-tipt scales, this streak not reticulated in general appearance; no discoidal spur within the cell. *Hindwing* short, broad, anterior margin convexly-angular in the middle, exterior margin convex; cell long; with a large pale ochreous upper discoidal patch, clothed with numerous laxly packed overlapping narrow round-tipt scales. Female with narrower and longer triangular-shaped wings.

Type.—*S. Nemertes*.

SALPINX NOVARÆ (Plate 40, fig. 1, 1a, b, ♂).

Euplœa Novaræ, Felder, Verh. Zool. Bot. Gesellsch. Wien. xii. p. 482 (1862); *id.* Reise Novaræ, Lep. ii. p. 317, pl. 39, fig. 7 (1867) ♂.

Euplœa (*Salpinx*) *Novaræ*, Marshall and De Nicéville, Butt. of India, i. p. 68 (1882).

Salpinx Novaræ, Moore, Proc. Zool. Soc. Lond. 1883, p. 300.

IMAGO.—Male. Comparatively larger than Burmese and Malayan specimens of *S. leucogonys*. Upside. *Forewing* dark blue-black and brilliantly glossed with blue; a pale blue spot on the costa above end of the cell, a submarginal row of spots, and in some two or three very minute dots above the posterior angle; on the disc are two pale blue short upper streaks beyond the cell, a small spot between the middle and lower median veinlets, and a short small spot below the blue sexual streak between the lower median and submedian vein, each of these discal spots, except the sexual mark, being absent in some specimens. *Hindwing* dark

rufescent olivaceous-brown, with prominent blue upper submarginal spots, and in some an indistinct lower submarginal and marginal series of small whitish spots; with a large pale ochreous upper discoidal patch, clothed with numerous laxly packed overlapping narrow round-tipt scales; costal border glossy cinereous brown. Underside rich dark brown. *Forewing* with small bluish white costal, upper discal, and very small submarginal and marginal spots; a large violet-white lower discal spot; posterior border broadly cinereous, the basal area between the median and submedian ochreous, the sexual mark clothed with very narrow longish brown and white scales, which are densely but laxly packed and have a few scattered thread-like intervening white scales, the ochreous adjacent area with long narrow taper-pointed loosely packed scales, and the posterior border with widely separated very narrow equally-pointed scales. *Hindwing* with prominent bluish-white small submarginal and marginal row of spots; some small white spots at the base. *Body* dark purplish-brown; head, palpi, thorax in front and beneath black, spotted with white; legs black; abdomen beneath with slight greyish segmental bands.

Expanse, ♂ 4 to $4\frac{1}{4}$ inches.

HABITAT.—Kar Nicobar.

This is a very rare species, for the possession of which I am indebted to Mrs. F. de Roëpstorff.

SALPINX LEUCOGONYS (Plate 41, fig. 1, 1a, b, c, ♂ ♀).

Salpinx leucogony, Butler, Trans. Linn. Soc. Zool. 2nd ser. i. p. 536, pl. 68, fig. 5, ♀ (1877-9).

Moore, Proc. Zool. Soc. Lond. 1883, p. 301.

Euplœa (Salpinx) vestigiata et leucogony, Marshall and De Nicéville, Butt. of India, i. p. 69 (1882).

Euplœa vestigiata (part), Distant, Rhop. Malayana, p. 27 (1882).

Salpinx lazulina, Moore, Proc. Zool. Soc. Lond. 1883, p. 300.

IMAGO.—Male. Similar to *S. Novaræ*. *Forewing* blue glossed; with a pale blue costal spot, two slender upper discal spots and a lower discal spot, and pale blue sexual streak between the median and submedian, and in some a slender spot below it; submarginal blue spots well defined, generally complete; marginal spots, when present, minute. *Hindwing* rufescent olivaceous-brown, dusky and tinged with blue towards the lower base; costal border glossy cinereous, with a large upper discoidal ochreous patch, prominent white small upper submarginal spots and less defined speckled-white lower submarginal spots, and more or less defined similar speckled-white lower marginal spots. Female. Upperside paler, more violaceous in tint, and less blue-glossed. *Forewing* with pale blue costal spot, small submarginal spots, and a pale blue narrow streak with sometimes a smaller contiguous lower streak (both being sometimes confluent) between the lower median and submedian vein. *Hindwing* with three upper submarginal white spots, and a lower submarginal and marginal ill-defined white-speckled more or less confluent spots. Underside dark rich brown.

Forewing with a small bluish-white costal spot, one—generally two—slender upper discal spots, a submarginal and marginal row of very small spots, and a large violet white lower discal spot; posterior border broadly cinereous, and *in the male* with the basal area between the median and submedian ochreous encompassing the pale brown sexual mark. *Hindwing* with a complete submarginal and marginal row of small bluish-white spots; basal spots white.

Expanse, $2\frac{3}{4}$ to $3\frac{1}{2}$ inches.

HABITAT.—Lower Burma; Malay Peninsula.

DISTRIBUTION.—Mr. De Nicéville (Butt. Ind. i. 68) records that “numerous specimens of this species were taken by Capt. C. H. E. Adamson, near Moulmein in June, and a specimen taken at Maylachoung by Capt. C. T. Bingham in September.” The figures on our plate 41, fig. 1, 1b, ♂ are from Moulmein specimens in Col. Swinhoe’s collection, and figs. 1a, c, ♂ ♀ are of specimens from Bankasoon, Lower Tenasserim, from specimens in the collection of Messrs. Godman and Salvin. In the Malay Peninsula, it occurs at Malacca, and Salanga.

INDO-MALAYAN ALLIED SPECIES OF SALPINX.—*S. vestigiata* (Butler, Proc. Zool. Soc. 1866, p. 288, ♂ only), the habitat of ‘Java’ being given for this species in the original description. On referring to the ‘Register’ in the British Museum, it is there stated that the specimen described by Mr. Butler, as the male type, was from Sumatra, the female only, also described and figured, being from Java. The latter specimen (female) is referable to *S. leucostictos*; the sexes of both forms, though separable, are probably only local representatives of one species. *Habitat*. Sumatra, Malay Peninsula.—*S. leucostictos*, Gmelin (Kirby, Trans. Ent. Soc. 1869, 358); *Syn*. Eunice, Godart. *Habitat*. Java.—*S. Dehaani* (Lucas, Rev. Zool. 1853, 313); a much smaller species than the preceding; expanse, $2\frac{3}{4}$ inches. *Habitat*. Java.—*S. Hobsoni* (Butler, Proc. Zool. Soc. 1877, 811). *Habitat*. N. Formosa.—*S. oculata* (Moore, P.Z.S. 1883, 302); figured by Semper in ‘Reisen Arch. Philippen,’ pl. 5, fig. 8, 10, ♂ ♀. *Habitat*. Mindanao.—*S. Hewitsoni* (Butler, P.Z.S. 1866, 295, pl. 30, fig. 2 ♀); also figured by Semper, *l.c.* pl. 5, fig. 9, ♀. *Habitat*. Philippines (Isle of Guam). *S. Negleyana* (Holland, Trans. Amer. Ent. Soc. 1887, 112, pl. 1, f. 2). *Habitat*. Hainan.

Genus PADEMMMA.

Pademma, Moore, Proc. Zool. Soc. Lond. 1883, p. 305.

Euplæa (*Salpinx* Sect. B), Marshall and De Nicéville, Butt. of India, i. p. 59 (1882).

IMAGO.—Male. Intermediate in form between *Salpinx* and *Isamia*. Differs from *Salpinx* in the forewing being comparatively narrower, the apex more acute, the exterior margin more oblique, and the *sexual streak* on the fore-wing shorter and broader, the widely-separated scales clothing it on the upperside also of a different form, these scales being narrow with bidentate-tips, and on the underside this streak

is clothed with very densely packed laxly-raised very narrow pointed-tipt scales, and with numerous interspersed slender scales. From typical *Isamia* the forewing differs in its shorter and more quadrate form, and in the shortness of the sexual mark.

Type.—P. Klugii.

PADEMMIA KLUGII (Plate 42, fig. 1 ♂, 1a, 1b, ♀).

Euplea Klugii, Moore, Catalogue Lep. Mus. East India Company, i. p. 130, ♂ ♀ (1857).

Salpinx Klugii, Butler, Journ. Linn. Soc. Zool. xiv. p. 294 (1878).

Euplea (Salpinx) Klugii, Marshall and De Nicéville, Butt. of India, i. p. 64 (1882).

Pademmi Klugii, Moore, Proc. Zool. Soc. Lond. 1883, p. 305, pl. 32, fig. 1, ♂.

Salpinx Grantii, Butler, Trans. Ent. Soc. Lond. 1879, p. 2, ♀.

Euplea (Salpinx) Grantii, Marshall and De Nicéville, Butt. of India, i. p. 65 (1882).

IMAGO.—Male. *Upperside*. *Forewing* dark purplish violet-brown, brilliantly glossed with steel-blue throughout in some lights; a pale blue small costal spot above end of the cell, an irregular-lunate spot within lower end of the cell, two upper discal white-centred streaks beyond the cell, a complete submarginal row of larger white-centred lobate-spots, and a marginal row of small rounded spots. *Sexual streak* in the type short, narrow, blue, and clothed with widely-separated narrow bidentate and tridentate-tipt scales.* *Hindwing* paler; darkest and blue-glossed in the middle; costal border broadly glossy cinereous-brown, with a large pale ochreous upper discoidal patch clothed with densely packed elongated round-tipt scales; a submarginal row of small round whitish spots, and a marginal row of smaller spots, the former obsolescent posteriorly and the latter anteriorly. Cilia alternated with white. *Underside* dark olivescence-brown. *Forewing* darker in the middle; with both rows of small creamy-white marginal spots, costal spot, and upper discal short streaks, and a larger lower discal spot between the middle and lower median veinlets; *sexual streak* dusky-brown, clothed with very densely packed laxly-raised very narrow point-tipt scales with numerous interspersed slender white scales; posterior border from the lower median glossy cinereous, with an ochreous patch of scales surrounding the lower portion of the sexual mark. *Female*. *Upperside*. *Forewing* blue-glossed throughout; with the costal, cell, upper discal, submarginal and marginal spots, as in the male, the latter row more or less obsolete, and sometimes entirely obsolete anteriorly; a small blue spot also between the middle and lower median veinlets, and a narrow streak above the submedian vein. *Hindwing* with white submarginal spots and indistinct lower submarginal and marginal spots.

Expanse, ♂ $3\frac{3}{4}$, ♀ $4\frac{1}{4}$ inches.

HABITAT.—Cachar, Silhet.

* In other specimens of P. Klugii from Cachar the sexual mark is clothed with broad tridentate and quadridentate-tipt scales.

The illustrations of this species on our Plate 42, figs. 1, 1a, are of the male and female type specimens of *P. Klugii*, and fig. 1b, of the female type of Mr. Butler's *Grantii*.

DISTRIBUTION.—According to Mr. De Nicéville (Butt. India, i. 65), "Mr. Wood-Mason met with this species commonly in Cachar from April to June, and Mr. A. O. Hume took it in the eastern hills of Manipur in May."

HABITS, &c.—In his "Notes on the Danainæ of Burma," published at Newcastle-upon-Tyne in 1889, Major C. H. E. Adamson, p. 9, in referring to what he there names '*E. Klugii*'—[but the correctness of the identification of his specimens with that species, however, being very doubtful]—says, "This is a most variable insect. I have found it in Akyab, Moulmein, and Bhamo, but most commonly at the latter place, where it affects during the months of January and February the sunny sandy beds of streams, settling close to the margin of the water, apparently to imbibe the moisture. It is a common insect, and may be found in suitable localities nearly all the year round. During the rainy season it is found in open places and paths through the jungles. . . . In Akyab both males and females appear to commence flying in March, and during April and May they are most numerous and in freshest condition. Many fresh specimens are, however, to be taken up to February. In April, May, and June, these insects are generally found in forest, while in November, December, January, and February, they frequent the moist beds of rivers, alighting on sand, mud, or pebbles close to the edge of the water."

This species, apparently, is a variable one, and the following forms, A, B, C, D, appear to be varieties of the same.

VARIETY A. *Pademna Augusta* (Plate 42, fig 2, 2a, ♂ ♀).

Pademna Augusta, Moore, Proc. Zool. Soc. Lond. 1883, p. 306, ♂.

Pademna Dharma, Moore, *id.* p. 306, pl. 32, fig. 2, ♀.

IMAGO.—Male. *Forewing*. Upperside darker blackish-brown than in typical *P. Klugii*, and of a more brilliant glossy-blue; with a bluish-white spot above end of the cell, a similar mark at lower end of the cell, two very slender streaks beyond, a spot between the middle and lower median veinlets; *sexual mark pale blue*, clothed with widely-separated rather broad tridentate and quadridentate-tipt scales; submarginal row of spots smaller, marginal row minute and obsolete at upper end. *Hindwing* with a broad chestnut-brown abdominal area; both marginal series of spots obsolescent.

FEMALE. *Forewing* violet-brown, glossed throughout with violet-blue; with a bluish-white costal spot above end of the cell, a very slight lower discal streak beyond the cell, and five upper submarginal spots, of which the three lowest are much elongated and clavate; a distinct white spot above the lower median veinlet, and a bluish streak above the submedian vein. *Hindwing* brown; with three small upper submarginal pure white spots, the others pale brown.

Expanse, ♂ $3\frac{1}{2}$, ♀ $3\frac{3}{4}$ inches.

HABITAT.—Nowgong, Assam.

The illustrations on our Plate 42, fig. 2, 2a are from the type specimens of *P. Augusta* and *P. Dharma*.

VARIETY B. *Pademna illustris* (Plate 43, fig. 1, 1a, ♂ ♀).

Salpinx illustris, Butler, Journ. Linn. Soc. Zool. xiv. p. 294, ♂ (1878).

Euplœa (Salpinx) illustris, Marshall and De Nicéville, Butt. of India, i. p. 66 (1882).

Pademna illustris, Moore, Proc. Zool. Soc. Lond. 1883, p. 307.

Male. Differs from typical *P. Klugii* on the forewing in the less glossy blue outer border, the cell spot being absent, the bluish-white upper discal spots smaller and abbreviated; no discal or submarginal spots present below the inferior discoidal interspace, the marginal spots prominent. *Sexual mark* clothed with widely-separated bidentate and tridentate-tipt scales. Hindwing with both marginal rows of spots prominent. Female. Forewing with anterior submarginal and complete marginal row of spots as in male. Hindwing with both marginal rows of spots.

Expanse, ♂ $3\frac{1}{2}$, ♀ $3\frac{3}{4}$ inches.

HABITAT.—Silhet; [? Arrakan].

The illustration on our Plate 43, fig. 1, is from the *type* male specimen of *P. illustris* in the British Museum collection, and fig. 1a is from a Burmese [? Arrakan] female in Mr. P. Crowley's collection.

VARIETY C. *Pademna imperialis* (Plate 43, fig. 2, 2a, ♂ ♀).

Pademna imperialis, Moore, Proc. Zool. Soc. Lond. 1883, p. 307.

Male and Female. Of the same brilliant glossy blue as in typical *P. Klugii*. *Forewing* differs in both rows of marginal spots being comparatively larger, and slightly confluent in the male. *Sexual mark* clothed with widely-separated narrow bidentate and tridentate-tipt scales. Hindwing in both sexes with a complete marginal row of small spots, the submarginal row being incomplete posteriorly.

Expanse, ♂ $3\frac{1}{2}$, ♀ 4 inches.

HABITAT.—E. Bengal; [? Arrakan].

The illustrations on our Plate 43, fig. 2, 2a are from the type specimens of *P. imperialis*.

VARIETY D. *Pademna regalis* (Plate 44, fig. 1, 1a, ♂ ♀).

Pademna regalis, Moore, Proc. Zool. Soc. Lond. 1883, p. 307.

Male and Female. Forewing of the same glossy-blue as in *P. illustris*; both rows of marginal spots complete to the posterior angle. *Sexual mark* clothed with widely-separated narrow tridentate and quadridentate-tipt scales. Hindwing also with both rows of marginal spots complete.

Expanse, ♂ $3\frac{1}{2}$, ♀ 4 inches.

HABITAT.—E. Bengal.

The illustrations on our Plate 44, fig. 1, 1a are from the type specimens of *P. regalis*.

PADEMMA MACCLELLANDI (Plate 44, fig. 2, 2a, ♂ ♀).

Pademna Macclellandi, Moore, Proc. Zool. Soc. Lond. 1883, p. 308, pl. 32, fig. 4, ♀.

IMAGO.—Male and Female. Upperside olivaceous-brown. *Forewing* with the basal area darker brown and slightly suffused with violaceous-blue; a large violet-blue spot at lower end of the cell, two slender streaks beyond, a large spot between the middle and lower median veinlets, and a streak above the submedian vein; a submarginal row of elongated whitish-centred spots, the two upper and lowest being small, and a marginal row of small distinct white spots. *Sexual mark* clothed with widely-separated broad tridentate and quadridentate-tipt scales. *Hindwing* darker brown; with a submarginal and marginal row of small very pale brown spots, the upper submarginal spot only being white.

Expanse, ♂ $3\frac{1}{2}$, ♀ 4 inches.

HABITAT.—Nowgong, Assam.

This form has a similar pattern of markings to that pertaining in *P. Klugii*, but differs in its much paler colouring, and in the absence of the brilliant steel-blue gloss present on the forewings of the latter species.

PADEMMA INDIGOFERA (Plate 44, fig. 3, ♂).

Pademna Indigofera, Moore, Proc. Zool. Soc. Lond. 1883, p. 306, pl. 32, fig. 3, ♂.

IMAGO.—Male. Differs from *P. Klugii* in being much smaller in expanse. Upperside. *Forewing* uniformly suffused with clear blue throughout; both marginal rows of spots similar and prominent, the two streaks beyond the cell very short, and the small costal spot distinct. *Sexual streak* short, broad, clothed with widely-separated narrow bidentate and tridentate-tipt scales. *Hindwing* also suffused with clear blue; the *discal patch* duller coloured; marginal row of white spots prominent, three prominent upper submarginal white spots, the lower obsolete. Underside dark olivescence-brown. *Forewing* with prominent violet-white costal spot, four discal spots, of which the lowest is large; submarginal and marginal white spots complete, those of both rows being of equal size. *Hindwing* with a prominent submarginal and marginal row of white spots. Some white spots at base of the wing. *Body* dark brown; head, palpi, thorax above and beneath black, spotted with white; legs black, fore femora white beneath; abdomen beneath with slight bluish bands.

Expanse, ♂ $2\frac{3}{4}$ inches.

HABITAT.—Nowgong, Assam.

PADEMMA SHERWILLII (Plate 45, fig. 1, ♂).

IMAGO.—Male. Upperside dark olivescence-brown. *Forewing* darker and blue-glossed on the basal half; a small pale blue costal spot above end of the cell, three slender upper discal spots beyond the cell, sometimes a small lower discal spot

between the middle and lower median veinlets; a submarginal upper series of five large spots, the upper one of which is smallest, the other pyriform and with a white centre, the three lower partially coalescing with the discals; a marginal upper or sometimes complete row of very minute dots. *Sexual mark* narrow, short, and pale blue. *Hindwing* with a prominent ochreous-white upper discoidal patch, the costal border glossy cinereous-brown; a submarginal upper series of prominent whitish spots, and a marginal row of minute spots. Underside paler; markings disposed as on upperside. *Forewing* with the five submarginal spots very small, marginal row complete, and large lower discal spot between the middle and lower median veinlets. *Sexual mark* brown, the posterior border broadly glossy brownish-cinereous. *Hindwing* with both marginal rows of spots complete, the submarginal spots rather large. *Body* dark brown; head, palpi, thorax in front and beneath black, spotted with white; legs black, fore femora and tibiæ white beneath; abdomen beneath with bluish bands.

Expanse, ♂ $3\frac{3}{4}$ inches.

HABITAT.—Assam.

DISTRIBUTION.—A single male specimen of this butterfly, from Shillong, and from which our figure is taken, is in the collection of Mr. Philip Crowley. A male also, from the Naga Hills, is in the collection of Mr. J. Jenner Weir.

PADEMMIA CRASSA (Plate 45, fig. 2, 2a, ♂ ♀).

Euplea Crassa, Butler, Proc. Zool. Soc. Lond. 1866, p. 278.

Euplea (Salpinx) Crassa, Marshall and De Nicéville, Butt. of India, i. p. 63 (1882).

Pademma Crassa, Moore, Proc. Zool. Soc. Lond. 1883, p. 307.

Euplea Erichsoni, Felder, Reise Novara, Lep. ii. p. 324 (1867).

Euplea (Salpinx) Erichsoni, Marshall and De Nicéville, Butt. of India, i. p. 63 (1882).

Pademma Erichsoni, Moore, Proc. Zool. Soc. Lond. 1883, p. 307.

IMAGO.—Male. Upperside dark olive-brown, the basal area darkest and faintly violetescent. *Forewing* with a very small violet-white costal spot above end of the cell, two, sometimes three small slender discal spots beyond end of the cell, a submarginal row of large opalescent white-centred spots, of which the upper are elongated and sometimes touch the corresponding marginals, and a complete marginal row of small spots. *Sexual mark* between the lower median and submedian veins short and thick, clothed with well-separated broad quadridentated-tipt scales. *Hindwing* with a prominent ochreous upper discoidal patch, the costal border broadly glossy-cinereous; a complete submarginal and marginal row of whitish spots. Underside paler; both wings with the marginal rows of spots as above. *Forewing* with the submarginal spots smaller than the marginal series; violet-white costal and discal spots distinct; also a large discal spot between the middle and lower median veinlets; *sexual mark* greyish, the broad posterior margin

cinereous externally and ochreous internally. Female. Upperside. *Forewing* with slightly-defined costal spot, upper discal small slender spots, submarginal and marginal row, and both rows on the hindwing as in male. Underside as on upper-side, except that the submarginal spots on the forewing are all very small, as in the male. Some white spots at base of the wing. *Body* dark brown; head, palpi, thorax in front and beneath black; fore femora white beneath; abdomen beneath with grey bands.

Expanse, ♂ $3\frac{1}{2}$ to 4, ♀ $3\frac{3}{4}$ to $4\frac{1}{4}$ inches.

HABITAT.—Lower Burma, Siam, Cochin China.

DISTRIBUTION.—“Occurs in Rangoon in June, Moulmein in June and August, and a number of specimens were taken by Mr. O. Limborg in Upper Tenasserim in the cold weather. Dr. J. Anderson obtained it in the Mergui Archipelago in the cold weather. It has also been taken by Capt. C. T. Bingham in the Mepley Valley in February, and in the Thoungyeen forests in May” (Butt. Ind. 65). It also occurs in Siam and Cochin China.

HABITS, &c.—In his “Notes on the Danainæ of Burma,” published at Newcastle-on-Tyne, in 1889, Major C. H. E. Adamson says, p. 7, “I have been collecting in Burma at all seasons of the year during the last ten years, and I have paid special attention to the *Salpinx* group, many hundreds of which have passed through my hands. In the group to which these insects [*E. Crassa*, *Erichsoni*, and *Masoni*] belong, the variation is endless, no two are exactly alike, and I am convinced that it is impossible for any man to say what should constitute a species from merely seeing dried specimens. In ground colour, in tone and extent of blue gloss; in the size, shape, and number of discal, marginal, and submarginal spots on the anterior wings; in the presence, absence, size, colour, and shape of the costal and cellular spot, infinite variety occur. Until the contrary has been proved by breeding, it seems to me that the proper course is to consider these insects as belonging to one species only, especially when they occur in the same places and at the same times. In 1883, on the 26th March, I saw the first of these insects on the wing, and by the end of the month, in some pineapple gardens near Akyab, both this species and *E. Klugii* were very common. I caught a large series of both species showing extreme variations. Throughout March, April, and May these insects remained very common; after that they became scarce, but some were to be found as late in the year as November. They seldom leave the shade of the jungles, and they rest sometimes in large numbers among the foliage of various fruit-trees. If the branches of some trees be shaken a dozen or more will ever fly lazily out from among the leaves, and flutter away to the nearest tree, where they will again hide themselves among the branches. I have specimens agreeing with the descriptions

of each of these insects from Akyab and Moulmein, and numerous intermediate varieties."

VARIETY A. *Pademna Burmeisteri* (Plate 45, fig. 3, 3a, ♂ ♀).

Pademna Burmeisteri, Moore, Proc. Zool. Soc. Lond. 1883, p. 309.

Male. Smaller than typical *P. Crassa*, but of the same colour. *Forewing* with the lower inner marginal row of spots of similar size to the outer row, and extending to the posterior margin. *Sexual mark* shorter and more slender. *Hindwing* with both rows of marginal spots smaller. Female. *Forewing* with the inner row of marginal spots larger than in the male, and also extending to the posterior angle.

Expanse, ♂ $2\frac{1}{2}$, ♀ $3\frac{1}{4}$ inches.

HABITAT.—Upper Tenasserim.

This form has also been taken at Saigon, in Cochin China.

VARIETY B. *Pademna Masoni* (Plate 46, fig. 1, ♂).

Salpinx Masoni, Moore, Proc. Zool. Soc. Lond. 1878, p. 823, ♂.

Euplea (Salpinx) Masoni, Marshall and De Nicéville, Butt. of India, i. p. 64 (1882).

Pademna Masoni, Moore, Proc. Zool. Soc. 1883, p. 309.

Male. Differs from typical *P. Crassa* in its darker colour; in the basal area of the forewing being bright glossy violet-blue, and the marginal spots confined more to the apex. *Sexual mark on the upperside* clothed with widely-separated, rather narrow, bidentate and tridentate-tipt scales. *Hindwing* less convex along the exterior margin, otherwise similarly marked.

Expanse, ♂ $3\frac{1}{4}$ inches.

HABITAT.—Upper Tenasse rim.

This variety has been taken only in Upper Tenasserim, where it is not uncommon. Mr. Otto Limborg obtained it at "Taoo, 3000-5000 feet elevation, above Ahsown" (Proc. Zool. Soc. 1878, p. 823).

VARIETY C. *Pademna apicalis* (Plate 46, fig. 2, 2a, ♂ ♀).

Pademna apicalis, Moore, Proc. Zool. Soc. Lond. 1883, p. 318.

Euplea crassa, Distant, Rhopalocera Malayana, p. 29, pl. 5, fig. 8, ♂ (1882).

Near to typical *P. Crassa*, but of a more greenish-olivaceous colour, contrasting distinctly thereby with the brownish olivaceous tint of the typical form. *Forewing* with a complete marginal row of spots, the submarginal row composed of five apical spots only. *Hindwing* with both marginal rows of spots small.

Expanse, $3\frac{1}{2}$ inches.

HABITAT.—Burma.

This variety has also been taken at Queda and Salanga, in the Malay Peninsula.

VARIETY D. *Pademna Pembertoni* (Plate 46, fig. 3, 3a, ♂ ♀).

Pademna Pembertoni, Moore, Proc. Zool. Soc. Lond. 1883, p. 308, pl. 32, fig. 6, ♂.

IMAGO.—Similar in colour to *P. Crassa*, but paler. Male. *Forewing* with both marginal rows of spots smaller and nearly obsolete posteriorly; beyond the cell are two slender short discal streaks of the same colour as the spots, and a prominent spot also on the costa above end of the cell. *Sexual mark* clothed with widely-separated broad tridentate and quadridentate-tipt scales. *Hindwing* with both marginal rows of spots obsolete towards the anal angle. Female. *Forewing* with very minute marginal spots, larger elongated oval submarginal spots, the two discal streaks beyond the cell, and sometimes two lower discal spots. *Hindwing* with the two marginal rows of spots almost obsolete.

Expanse, ♂ $3\frac{1}{2}$, ♀ 4.

HABITAT.—Lower Burma (Magaree, Pegu).

PADEMMA UNIFORMIS (Plate 47, fig. 1, ♂).

Pademna uniformis, Moore, Proc. Zool. Soc. Lond. 1883, p. 308.

IMAGO.—Male. Upperside of a much darker and more uniform olivaceous-brown colour than *P. Crassa*, the forewing basally suffused with a violet-blue tint; marginal row of spots very minute, white, and obsolete anteriorly, the submarginal row of spots also small, white, and decreasing in size anteriorly. *Sexual mark* short, broad, clothed with well-separated broad tridentate and quadridentate-tipt scales. *Hindwing* with the marginal row of spots minute and obsolescent anteriorly, the submarginal row being obsolete posteriorly.

Expanse, $3\frac{1}{2}$ inches.

HABITAT.—E. Bengal, Shillong.

The illustration on our Plate 47, fig. 1, is from a male specimen, taken at Shillong, in the collection of Mr. P. Crowley.

PADEMMA KOLLARI (Plate 47, fig. 2, 2a, ♂ ♀).

Euplaea Kollari, Felder, Reise Novara, Lep. ii. p. 325, ♂ (1867).

Pademna Kollari, Moore, Proc. Zool. Soc. Lond. 1883, p. 309, pl. 29, fig. 9, ♂.

Isamia Rothneyi, Moore, Entom. Monthly Mag. 1882, p. 34.

Euplaea (*Salpinx*) *Sinhala*, Marshall and De Nicéville, Butt. of India, i, p. 66, pl. 7, fig. 12, ♂ ♀ (1882).

IMAGO.—Male. Upperside dark olive-brown, basal area pitchy-brown. *Forewing* with a submarginal row of ochreous-white spots, and a marginal row of smaller spots, both rows decreasing in size towards the costa, and of similar size to those in *Crastia* Core and C. Coreoides. *Sexual mark* short and broad, clothed with widely-separated rather narrow mostly tridentate-tipt scales. *Hindwing* with a pale flesh-coloured upper discoidal patch, a submarginal row of oval ochreous-white spots, and a marginal row of smaller spots, both rows also of similar size to those in the

species of *Crastia* above cited ; costal border broadly glossy-cinereous. Underside more uniformly olivescens-brown ; both wings with the marginal rows of spots as above. *Forewing* also with a small violet-white costal spot above end of the cell, and four discal spots, of which the three upper are slender and the lowest large. Sexual mark distinct, greyish-brown, and bordered by an ochreous patch ; posterior border cinereous. Some white spots at base of the wing. *Body* brown ; head, palpi, thorax in front and beneath black, spotted with white ; legs black, fore femora and tibiæ beneath white. Female paler, both marginal rows of spots on upper and underside as in male. *Forewing* on the underside also with the discal spots and a short slender spot below the median veinlet ; the posterior margin being cinereous-white.

Expanse, ♂ $3\frac{1}{2}$ to $3\frac{3}{4}$, ♀ 4 inches.

HABITAT.—Lower Bengal, Bombay, South India.

For the opportunity of correctly identifying this species we are indebted to Dr. Rogenhofer, the Custodian of the Imperial Zoological Museum at Vienna, who kindly favoured us with a coloured drawing of *Felder's type* specimen of *P. Kollari*, the locality of which was also previously unknown. In appearance it much resembles, and is a mimick of, the common *Crastia Core*, but may be distinguished by its shorter and broader wings, and by the male possessing a pale ochreous upper-discal patch on the upperside of the hindwing.

DISTRIBUTION.—The locality of the *type* specimen, described by Dr. Felder, was not recorded. The first authentically-known habitat of the species was that given by Mr. G. A. J. Rothney (Entom. Monthly Mag. 1882, 34), who captured a single specimen at Barrackpur, near Calcutta, but, mistaking it, however, for a specimen of the common *C. Core*. In the neighbourhood of Calcutta, it has since been found by Mr. L. De Nicéville "throughout the year," who also says (Journ. Asiat. Soc. Bengal, 1885, 41) that it is "by no means a rare species, and occurs in company with *C. Core*." According to Mr. W. C. Taylor's List of Orissa Butterflies, 1888, p. 1, it is "rather common at Khorda." Colonel Swinhoe (Proc. Zool. Soc. 1888, 348) "took it in Bombay in August, and at Poona in September, but it is not often met with, though it is not believed to be rare. It so exactly resembles *C. Core* in coloration that it is passed over as that species." Mr. H. S. Fergusson "took it at Calicut in September." It also occurs in N. Kanara. Mr. G. F. Hampson (Journ. As. Soc. Beng. 1888, 348) records taking "two males on the northern slopes of the Nilgiris at 3500 feet elevation, and three pairs at 5000 feet, on the western slopes." "Mr. Rhodes Morgan obtained it in the Wynaad. Mr. H. S. Fergusson took it at Trevandrum in July, and Mr. W. T. Blanford obtained it at Bhadrachallum."

A male specimen which Mr. De Nicéville (Butt. India, p. 67) refers to this species, taken by Mr. Otto Müller in the Sikkim Terai, is described as "having the

upperside of the forewings very perceptibly shot with blue, the marginal rows of spots on both wings smaller, especially the submarginal series on the forewing, the spot below the third median nervule in that series being obsolete." As this description of the Sikkim insect does not well agree with our present species, further verification is necessary before it is certain that *P. Kollari* extends its range so far north. Mr. H. J. Elwes (Trans. Ent. Soc. 1888, 301), following Mr. L. De Nicéville's identification, also refers to this species as occurring, "but not commonly, in the Sikkim Terai," and mentions having "a specimen 'believed' to be from the Tista Valley, agreeing with Calcutta specimens." This presumed 'Tista' specimen, which has been kindly lent to me for examination, is a male, and has been wrongly identified by Mr. Elwes, for the specimen proves to be a male of the allied *P. Crassa*, of which latter species the present known range of authentically named forms is confined to Lower Burma, and Mr. Elwes's specimen may therefore be taken to have been incorrectly labelled as to its locality.

HABITS OF IMAGO.—Mr. L. De Nicéville, who has observed this species in the neighbourhood of Calcutta, says that it "occurs in company with *C. Core*. Both species having a very strong but not actually disagreeable odour, which neither my friends nor I are able to compare with any named scent. The males of both species may often be observed patrolling a small aerial space with the end of the abdomen curled under the body towards the thorax, and with the two beautiful yellow anal tufts of long hair distended to their fullest extent at right angles to the body. It seems very probable that these tufts or brushes of hair are used like holy-water sprinklers (aspergilli) for disseminating the scent with which their bodies are charged as an attraction for the females or to warn off their enemies; but it should be observed that the females are similarly odoriferous, though they are unfurnished with the male disseminating organs. On the wing I can generally distinguish the males of *P. Kollari* from *C. Core*; it is impossible, however, to distinguish between the opposite sexes of either of the two species when flying."

PADEMMA SINHALA (Plate 47, fig. 3, 3a, ♂ ♀).

Euplexa Sinhala, Moore, Annals and Mag. Nat. Hist, 1877, p. 45.

Isamia Sinhala, Moore, Lepidoptera of Ceylon, i. p. 10, pl. 5, fig. 1, ♂ (1880).

Pademna Sinhala, Moore, Proc. Zool. Soc. Lond. 1883, p. 309.

IMAGO.—Male. Upperside dark olive-brown, external margins paler. Forewing with a submarginal row of small ochreous-white spots, and a marginal row of minute spots. Sexual mark broad, oval, clothed with widely-separated narrow bidentate and tridentate-tipt scales. Hindwing with a broad flesh-coloured upper discoidal patch; costal border broadly glossy-cinereous; a submarginal series of oval ochreous-white spots, and a marginal row of small round spots. Underside

paler olive-brown throughout. *Forewing* with a curved discal series of violet-white spots and a spot within end of the cell; posterior margin broadly cinereous; *sexual mark* dusky grey. Both wings with a submarginal and marginal row of spots as on upperside. *Body* dark brown; head, palpi, thorax above and beneath black, spotted with white; legs black, fore femora and tibiæ white beneath; abdomen beneath with grey bands. Female marked as in the male above, the submarginal spots on the forewing of the same size and not extending to the apex; on the underside the forewing has a very short whitish streak between the lower median and submedian vein, the posterior border being broadly whitish cinereous.

Expanse, ♂ ♀ $3\frac{1}{4}$ to $3\frac{3}{4}$ inches.

HABITAT.—Ceylon.

Distinguishable from *P. Kollari* in the less prominence and smaller size of both rows of marginal spots on the forewing, those of the submarginal row not extending to the apex, and those on the hindwing being somewhat smaller.

This species has a similarity of colour and pattern of the markings to the Ceylonese *Crastia Asela* and also to *Narmada montana*.

DISTRIBUTION.—Occurs only in Ceylon. It has been taken at Galle and Kandy by Capt. Wade. According to Mr. F. M. Mackwood "it is an up-country butterfly."

INDO-MALAYAN ALLIED SPECIES OF PADEMMA.—*P. minorata* (Moore, Proc. Zool. Soc. Lond. 1878, p. 695, ♂). A small species allied to *P. Klugii*. *Habitat*. Hainan. In coll. Godman and Salvin. *P. Staudingeri* (Kheil, Rhop. Insel Nias, p. 17, pl. 1, fig. 3, 4, ♂ ♀, 1884). *Habitat*. Island of Nias, W. coast of Sumatra.

Genus ISAMIA.

Isamia, Moore, Lepidoptera of Ceylon, i. p. 10. (1880); Proc. Zool. Soc. Lond. 1883, p. 311.

Euplœa (Sect. *C. part*), Distant, Rhopalocera Malayana, p. 26 (1882).

Euplœa (*Salpinx* sect. *A.*), Marshall and De Nicéville, Butt. of India, i. p. 59 (1882).

IMAGO.—Male. Wings large, broad. *Forewing* elongated, somewhat quadrate, apex slightly acuminate, exterior margin oblique, waved, posterior margin convex. *Sexual mark* large, elongated, appearing on the upperside as if reticulated, but clothed with widely-separated somewhat narrow bidentate and tridentate-tipt scales, and on the underside clothed with narrow thickly-disposed pointed scales, interspersed with a few narrow scales and a few projecting longer very slender claviform scales. *Hindwing* triangular, costa long, convex, apex and exterior margin convex, waved, with a moderate-sized *pale-ochreous upper discoidal patch* clothed with dense but loosely-disposed somewhat narrow round-tipt scales.

Isamia differs from typical *Salpinx* in the male having the forewing prolonged at the apex, the exterior margin being more oblique and waved, the posterior margin

more convex, the cell longer, narrower, with a short upper discocellular spur within the cell; and with a large sexual mark of twice the length. The hindwing is more rounded, the costa convex, and waved outer margin, cell shorter and narrower, and discoidal patch smaller.

Type.—*I. superba*.

ISAMIA SPLENDENS (Plate 48, fig. 1, 1a, ♂, 1b, ♀, 1c, var. ♂).

Euplœa splendens, Butler, Proc. Zool. Soc. Lond. 1866, p. 272, ♂.

Salpinx splendens, Butler, Journ. Linn. Soc. Zool. XIV., p. 294 (1878).

Isamia splendens, Moore, Proc. Zool. Soc. Lond. 1883, p. 311, pl. 30, fig. 3, ♂.

Euplœa Rogenhoferi, Felder, Reise Novara, Lep. ii., p. 325, ♂ (1887).

Euplœa (Salpinx) Rogenhoferi, Marshall and De Nicéville, Butt. of India, i. p. 60 (1882).

Euplœa Irawada, Moore, Ann. and Mag. Nat. Hist. 1877, p. 45, ♂.

IMAGO.—Male. Upperside dark blackish-brown. *Forewing* brilliantly glossed with steel-blue throughout, a pale blue speckled round spot within lower end of the cell, a dot on the costa above it, a series of five oblong discal spots, a submarginal row of seven small white-centred spots, the lowest being minute or obsolete, and the upper two or three sometimes oblong, a marginal lower row of minute dots. *Sexual mark* pale brown, elongated, narrow, clothed with widely-separated somewhat narrow bidentate and tridentate-tipt scales. *Hindwing* paler, lower basal half slightly blue tinged; with a prominent *pale ochreous-white upper discoidal patch*, clothed with densely-packed but loosely-disposed somewhat narrow round-tipt scales, anterior border broad and glossy-cinereous; a submarginal and a marginal series of small obsolescent pale brown spots. Underside purpurescent olive-brown, darker basally. *Forewing* with a pale blue costal spot, lower cell-spot, a discal spot between the upper and middle median veinlet, and sometimes three upper discal very minute dots, a large lower discal whiter spot; a submarginal row of very small white spots and some smaller marginal spots; *sexual mark* pale brown, clothed with thickly-packed narrow-pointed scales, interspersed with a few white narrower scales, and a few projecting longer very slender claviform white scales; posterior border glossy-cinereous. *Hindwing* paler brown between the outer veins, as if rayed; with a very small bluish white spot within end of the cell, four or five discal spots, a submarginal and marginal row of small white spots, the submarginal row incomplete posteriorly. *Body* dark brown; head, palpi, thorax in front and beneath black, spotted with white; legs black, fore femora white beneath; abdomen beneath with pale blue bands.

Female with the posterior margin of the forewing straight. Upperside and underside marked as in the male, except in the absence of the sexual streak on the forewing and the ochreous patch on the hindwing. Forewing beneath with an elongated white streak above the submedian vein.

Expanse, ♂ $3\frac{1}{4}$ to $4\frac{1}{4}$, ♀ $4\frac{1}{4}$ inches.

HABITAT.—Eastern Himalayas, Upper Assam, Cachar, Khasia Hills, Burma.

Our illustration on plate 48, fig. 1, represents a male from Darjiling; fig. 1a is from the Burmese male type of *Irawada*, fig. 1b of a female from Bassein, and the variety of the male, figured on plate 48, fig. 1c, is from Rangoon (taken in October, and now in the collection of Col. C. Swinhoe). On the upperside of the forewings this latter specimen has the usual costal, cell, and discal spots incipiently indicated by a few blue scales only, no submarginal or marginal spots are visible, and the sexual mark is narrower and shorter than in other Burmese specimens of *T. splendens* under examination.

DISTRIBUTION.—According to Mr. L. De Nicéville (Butt. Ind. 61) "it is found, but not very commonly, in Assam, extending through the Eastern Himalayas as far as the valley of the Sardah, which separates Kumaon from Nepal. To the westward of this range it is much rarer than to the eastward. Mr. Wood Mason took both sexes in Cachar from April to June." Mr. Otto Müller obtained it in Sikkin in June. Mr. L. De Nicéville (J. A. S. Beng. 1881, 55) took "a single male in Sikkin in October." In Burma it has been taken at Bassein in October. It occurs also in Rangoon and at Tounghoo. Major C. H. E. Adamson (Notes on the Danainæ of Burma, p. 6) says, "I caught two specimens of this insect in March, 1883, on the edge of the Htaroon Choung, in Arrakan. In the same year I caught one male and one female soon afterwards near Akyab. During April, in the Arrakan Hill tracts, I found it flying abundantly in certain places. I also caught some specimens at Booseedoung, on the Mayoo river, in April, one male at Akyab on the 15th May, and one on 26th June. The brilliant blue gloss is very apparent when on the wing, and so are the bright yellow caudal appendages of the male. As found in Arrakan this is a very constant species, both in colour and in the number and extent of spots. I have only taken one female."

ISAMIA MARGARITA (Plate 49, fig. 1, 1a, b, ♂, 1c, d, ♀).

Euplœa margarita, Butler, Proc. Zool. Soc. Lond. 1866, p. 279. Distant, Rhopal. Malayana, p. 31, pl. 4, fig. 3, ♂ (1882).

Salpinx margarita, Butler, Journ. Linn. Soc. Zool. xiv. p. 294 (1878). Moore, Proc. Zool. Soc. 1878, p. 823.

Euplœa (Salpinx) margarita, Marshall and De Nicéville, Butt. of India, i. p. 62 (1882).

Euplœa (Salpinx) Adamsoni, Marshall, Journ. Asiatic Society, Bengal (1880), p. 245, ♂.

IMAGO.—Male. Upperside dark rufescent-brown, in some more of an olivescient tint. Forewing darkest and brilliantly glossed with blue from the base to or beyond two-thirds the length, but never extending to the outer margin; with a small pale blue costal spot above end of the cell, a small round spot within lower end of the cell, two lower discal spots between the median veinlets, the lower larger and oval, and

sometimes there are three or four slender upper discal spots indicated by the presence of a few pale blue scales, in others all these spots are obsolescent; submarginal spots more or less indistinct, or obsolete, minute, white, the series never complete, and when present, the two lower and the two between the discoidal veinlets are more or less prominent, and two upper enlarged pale spots are incipiently-indicated before the apex; one or two, sometimes three lower, and one or two upper marginal minute spots are present. *Sexual mark* between the lower median and submedian vein elongated, clothed with widely-separated rather short bidentate and tridentate-tipt scales. *Hindwing* with a large *pale ochreous upper discoidal patch* and a broad cinereous anterior margin; a submarginal and a marginal row of whitish spots, the former row more or less oval towards the anal angle and slightly varying in length in different specimens, sometimes also both rows are composed of smaller and less defined spots or are entirely obsolescent. Underside paler olivescence-brown. *Forewing* with the small pale blue costal, cell, discal, lower submarginal and marginal white spots, as in upperside, the lower discal spot being much enlarged and violet-white; posterior margin broadly cinereous with a broad ochreous upper medial patch. *Hindwing* with both rows of whitish spots as in the upperside, with a small violet-white cell spot, and five or six small slender discal spots. Some white spots at base of wing. Female. Upperside as in male, except in the forewing having the posterior margin straight, and in the absence of the sexual mark. *Forewing* with small costal, cell, discal, and marginal spots present or obsolescent, as in that sex. *Hindwing* with similar marginal rows of spots. Underside as in male. Forewing with the cell spot sometimes lunate, and an elongated narrow streak above the pale posterior margin.

Expanse, ♂ $3\frac{1}{4}$ to $4\frac{1}{4}$, ♀ $4\frac{1}{4}$ inches.

HABITAT.—Lower Burma, Tenasserim; Malay Peninsula.

DISTRIBUTION.—Has been taken at Rangoon in September. "Capt. C. H. E. Adamson took it near Moulmein in June, at Moulmein in the autumn, and at the Mayla Choung in September. It has been taken at Bassein in October. Capt. C. T. Bingham obtained numerous specimens in the Thoungyeen forests, Tenasserim, in December" (Butt. Ind. 62). "Mr. O. Limborg (P. Z. S. 1878, 823) found it at Hatseiga, and at the Hougduaran source in Upper Tenasserim during the cold weather." Dr. J. Anderson took it somewhat commonly in the Mergui Archipelago in the cold weather from November to March.

In the Malay Peninsula, Mr. Distant (Rhop. Malay. 31) records it from Malacca and Penang.

HABITS, &c.—According to Major C. H. E. Adamson (Notes on the Danainæ of Burma, 1889, p. 7) "numerous specimens taken in June in Salween Park, Moulmein, were flying about after a heavy rain in the bright sunshine. It is not at all a

common insect. On all the specimens taken the blue gloss extends over the basal two-thirds of the anterior wings; the two rows of spots on the margin of the hindwings are invariably distinct, and the inner row in the female is elongate. On the anterior wings the number of the blue discal spots varies, and in one specimen they are entirely absent."

VARIETY. *Isamia Brahma* (Plate 50, fig. 2, ♂).

Isamia Brahma, Moore, Proc. Zool. Soc. Lond. 1883, p. 314, ♂.

Euplœa margarita, Distant, Rhop. Malayana, pl. 4, fig. 3, ♂.

Male. *Forewing* shorter than in typical *I. margarita*, not so broad, the exterior margin more oblique; with an intense violet-blue gloss extending to three-fourths of the wing; a very indistinct minute blue dot at end of the cell, one on the costa above it, and a white dot near the posterior angle; sexual mark about half the length of that in typical *margarita*. *Hindwing* with two rows of small prominent white spots.

Expanse, $3\frac{1}{2}$ inches.

HABITAT.—Hatseiga, Moulmein.

This butterfly has much the appearance of *Menama modesta*.

ISAMIA CARPENTERI (Plate 50, fig. 1, 1a, ♀).

IMAGO. Female. Upperside dark fuliginous-brown. *Forewing* with the basal half blackish and glossed with brilliant steel-blue, the blue extending obliquely outward across the wing from end of the cell to one-fourth from the posterior angle (not parallel with the outer margin as in *I. margarita*); a very small white costal spot above end of the cell, and faint traces of three minute discal spots between the medians and submedian vein, the lowest being most prominent; a more or less complete row of very small white submarginal and marginal spots. *Hindwing* with the basal area blackish and brilliantly glossed with steel-blue; a very small brownish-white spot within end of the cell, a discal series of seven very small spots, the lowest being very slender, followed by a submarginal row of narrow oval spots, and a marginal row of smaller somewhat conical spots, of which the three or four last of each row are coalesced. Underside olivescence-brown, discal area somewhat darker and violet. *Forewing* with a small violet-white costal spot, one within end of the cell, three discal, of which the upper is slender and the lowest rather large and oval; a lengthened narrow streak between the lower median and submedian and the posterior border broadly violet-white; submarginal and marginal small white spots as on upperside. *Hindwing* with a small violet-white spot within end of the cell, a discal series of seven, a submarginal and marginal row of creamy-white spots, as on upperside; some white dots at base of the wing. *Body* dark brown; head, palpi, thorax in front and beneath black, spotted with white, legs black, fore femora white beneath; abdomen beneath with white segmental bands.

Expanse, ♀ $4\frac{3}{4}$ inches.

HABITAT.—Mergui Archipelago.

Two specimens of the female of this butterfly, in the collection of the British Museum, were recently taken in King's Island Sound, on the 8th February, by Commander A. Carpenter.

INDO-MALAYAN ALLIED SPECIES OF *ISAMIA*.—*I. superba* (Herbst, Nat. Insekten, vi. p. 14, pl. 119, fig. 3, ♀, 1793). *Habitat.* S. China, Hongkong.—*I. sinica* (Moore, Proc. Zool. Soc. Lond. 1883, p. 312). *Habitat.* S. China.—*I. Midamus* (Linn. Syst. Nat. x. p. 470 (1758); *id.* xii. p. 765 (1767); De Geer, Acta Holmiæ, ix. p. 209, pl. 6, fig. 1, 2, ♀ (1748); Ehret, Plantæ et Papilion. pl. xi. ♂ (1748); Hübner, Samm. Exot. Schmett. i. pl. 24, fig. 3, 4, ♀ (1806). *Habitat.* S. China, Canton.—*I. Alopia* (Godart, Enc. Méth. ix. p. 177, ♂ ♀, 1819). *Habitat.* S. China.—*I. Marseuli* (Moore, P. Z. S. 1883, p. 313). Allied to *I. margarita*. Differs on the forewing in the blue tint being confined more to the base, the marginal spots being quite obsolete, and the sexual mark only half the width, though of the same length. On the hindwing the two marginal rows of spots are very indistinct. Expanse, $3\frac{1}{10}$ inches. *Habitat.* Saigon, Cochin China. In Coll. C. Oberthür.—*I. Grotei* (Felder, Reise Novara, Lep. ii. p. 339, ♂ only, 1867). *Habitat.* Cochin China.—*I. Fabricii* (Moore, P. Z. S. 1883, p. 315). *Habitat.* Cochin China. In Coll. C. Oberthür.—*I. Dejeani* (Distant, Rhop. Malayana, p. 29, pl. 4, fig. 1, ♂, 1882; Moore, P. Z. S. Lond. 1883, p. 314). Near to *I. Chloe*. *Habitat.* Malacca, Sumatra.—*I. Rafflesi* (Moore, P. Z. S. Lond. 1883, p. 314). *Habitat.* Java. In Coll. Godman and Salvin.—*I. Choë* (Guérin, Delessert's Voy. Inde, ii. p. 71, 1843); Distant, Rhop. Malayana, p. 30, pl. 4, fig. 2, ♂. pl. 2, fig. 5, ♀ (1882).—*Syn.* *I. Singapura* (Moore, P. Z. S. 1883, p. 315). *Habitat.* Malay Peninsula, Singapore. *I. Sophia* (Moore, P. Z. S. 1883, p. 315). *Habitat.* Sumatra. In Coll. F. Moore & British Museum.—*I. Ægyptus* (Butler, P. Z. S. Lond. 1866, p. 277). *Habitat.* S. Borneo; Billiton.—*I. Loweii* (Moore, P. Z. S. 1883, p. 316). *Habitat.* Borneo. In Coll. C. Oberthür.—*Isamia Clorinde* (Staudinger). *Habitat.* Island of Palawan.—*I. Dameli* (Moore, P. Z. S. 1883, p. 316). *Habitat.* Shanghai, N. China. In Coll. G. Semper.

MIMICKS OF SPECIES OF *ISAMIA*.—The male of the Elymnine butterfly, *Elymnias leucocyma*, as well as the Papilionid, *Isamiopsis Telearchus*, are excellent mimicks of the *Isamia splendens*.

Genus TIRUNA.

Tiruna, Moore, Proc. Zool. Soc. Lond. 1883, p. 316.

MALE.—Forewing comparatively shorter than in typical *Isamia*; costa less arched, exterior margin less oblique, somewhat rounded towards the apex, and less convex at the posterior angle; the posterior margin very convex; upper discocellular with a short spur emitted within the cell. *Sexual mark* narrow and strongly impressed. Hindwing shorter and broader, and with a distinct upper discoidal patch.

Type.—T. Roëpstorffii.

TIRUNA ROËPSTORFFII (Plate 50, fig. 3, ♂).

Tiruna Roëpstorffii, Moore, Proc. Zool. Soc. Lond. 1883, p. 316, pl. 32, fig. 8, ♂.

IMAGO.—Male. Colour and pattern of markings similar to *Karadina Andamanensis*. Upperside pale olive-brown, but darker than in *K. Andamanensis*. Forewing with a similarly-disposed submarginal and marginal row of olivaceous-white spots; the marginal series smaller, conical, and extending to the apex, the two submarginal spots between the median veinlets indented on their outer edge and the lowest spot divided into two; a discal row of much paler spots, and a similar rounded spot within lower end of the cell; sexual mark blackish. Hindwing with the submarginal row of spots narrower than in *K. Andamanensis*, the marginal row smaller and conical; discoidal patch olivaceous-white.

Expanse, $3\frac{1}{2}$ inches.

HABITAT.—Andaman Isles.

This is a very rare species, the only example known to me being the type specimen of the male in the collection of Herr G. Semper, of Altona. In general form, colour, and pattern, it much resembles the *Karadina Andamanensis*, and is a mimic of that species.

INDO-MALAYAN ALLIED SPECIES OF TIRUNA.—*T. Ochsenheimeri* (Lucas, Rev. et Mag. Zool. 1853, 315, ♂); the type specimen of which has been personally examined and a comparative description of it given in my "Monograph of the Euploeinæ," in P. Z. S. 1883, p. 317. *Habitat.* Java.

Genus NARMADA.

Narmada, Moore, Lepidoptera of Ceylon, i. p. 13 (1880), Proc. Zool. Soc. Lond. 1883, p. 318.

Euplœa (*Stictoplœa* part), Marshall and De Nicéville, Butt. of India, i. p. 90 (1882).

IMAGO.—Male. Forewing elongated, triangular, costa slightly arched, apex somewhat acute, exterior margin oblique, posterior margin slightly convex; upper discocellular with a short spur emitted within the cell. Two sexual marks between the lower median and submedian veins, the upper streak clothed with widely-separated short scales of irregular shape, having broad bluntly bidentate or rounded tips, and the lower streak clothed with widely-separated short tridentate-tipt scales; both these streaks, on the underside of the wing, being clothed with short regularly-disposed round-tipt ribbed scales, interspersed with a few narrow whitish scales and a very few extremely slender clavate white scales. Hindwing triangular.

Type.—N. Coreoides.

This genus differs from typical *Stictoplœa* in the more triangular form of both wings, the forewing being narrower, more acuminate, and the sexual marks shorter. Pattern of markings and coloration similar to typical *Crastia* (*C. Core*).

NARMADA COREOIDES (Plate 51, fig. 1, 1a, ♂ ♀).

Euplœa Coreoides, Moore, Annals of Natural History, 1877, p. 44. Butler, Journ. Linn. Soc. Zool. XIV., p. 301 (1878).

Narmada Coreoides, Moore, Lep. of Ceylon, i. p. 13 (1880); Proc. Zool. Soc. Lond. 1883, p. 318, pl. 29, fig. 10, ♂.

Euplœa (Stictoplœa) Coreoides, Marshall and De Nicéville, Butt. of India, i. p. 90 (1882).

IMAGO.—Male. Upperside dark velvety olive-brown, palest externally. *Forewing* with a prominent submarginal and a marginal row of small whitish spots. *Two elongated silky sexual marks* between the lower median and submedian vein; the upper streak being clothed with widely-separated short scales of irregular shape with broad bluntly-bidentated or rounded tips, and the lower streak clothed with widely-separated short tridentate-tipt scales. Hindwing with broader rows of whitish oval and rounded submarginal spots and smaller rounded marginal spots, anterior margin broadly glossy-cinereous, clothed with densely-packed broad abruptly taper-pointed striated scales. Underside paler; marginal spots as above. Both wings with a small violet-blue spot at end of the cell and contiguous discal series beyond; *sexual marks* on forewing pale brown, both clothed with short regularly-disposed round-tipt ribbed scales, interspersed with a few narrow whitish scales and a very few extremely slender clavate white scales; the posterior margin glossy cinereous and clothed with round-tipt widely-separated ordinary-shaped scales. *Body* dark brown; head, palpi, thorax in front and beneath black, spotted with white; legs black, fore femora beneath white; abdomen beneath with grey segmental bands. Female paler. Both wings with marginal rows of spots as in the male, the submarginal series above and the discal violet-blue spots on the forewing beneath being larger; two whitish elongated streaks above the submedian; posterior border cinereous.

Expanse, ♂ $3\frac{1}{4}$, ♀ $3\frac{1}{2}$ inches.

HABITAT.—South India.

This species has much the general appearance of *Crastia Core*, found also commonly in the same localities, but can easily be distinguished from it by the presence of *two* sexual marks in the male, the female showing on the underside of the forewing two pale corresponding streaks, instead of one, as in *C. Core*.

DISTRIBUTION.—This species appears to be confined to South India. Mr. L. De Nicéville (Butt. of India, 91) says it "is not common." Mr. W. C. Taylor, in his List of Orissa Butterflies, enumerates it as being "rare at Khorda," but his identification of the species is probably erroneous, and requires confirmation. It occurs at Bangalore in Mysore, North Canara, Malabar, and the Wynaad. Mr. G. F. Hampson (J. A. S. Beng. 1888, 348) "found it with *C. Core*, not uncommonly in the spring and autumn, at all elevations on the Nilgiris." It also has been taken at Trevandrum in Travancore in May, by Mr. H. S. Fergusson.

NARMADA MONTANA (Plate 51, fig. 2, 2a, ♂ ♀).

Euploeä montana, Felder, Reise Novara, Lep. ii. p. 330 (1867), ♂ ♀.

Narmada montana, Moore, Lepidoptera of Ceylon, i. p. 13, pl. 6, fig. 1, ♂ (1880); Proc. Zool. Soc. Lond. 1883, p. 318.

Euploeä (Stictoploeä) montana, Marshall and De Nicéville, Butt. of India, i. p. 91 (1882).

Euploeä Lankana, Moore, Annals and Mag. of Nat. Hist. 1877, p. 44, ♂.

Stictoploeä Lankana, Butler, Journ. Linn. Soc. Zool. XIV. p. 302 (1878).

IMAGO.—Male. Upperside dark velvety olive-brown, paler externally. *Forewing* with a submarginal and a marginal row of very small indistinct ochreous-white spots, which are obsolescent anteriorly. *Two elongated silky sexual marks* between the lower median and submedian vein. *Hindwing* with a submarginal and a marginal row of brownish-white spots, the former row oval from the anal angle and duplex anteriorly, the latter row smaller and round; anterior border broadly glossy-cinereous. Underside paler; marginal white spots as above, those on the forewing more prominent. *Forewing* with a small violet-white costal spot above end of the cell, one at lower end of the cell, and a contiguous discal series beyond; *sexual marks* pale brown and longer than on upperside; posterior margin cinereous. *Hindwing* with a small violet-white cell spot, and seven discal spots; some white spots at base of the wing. *Body* dark brown; head, palpi, thorax above and beneath black, spotted with white; legs black, fore femora white beneath; abdomen beneath with grey bands. Female. Upperside as in the male, except the sexual marks, and in the posterior margin of the forewing being straight. Underside also as in the male; two elongated whitish streaks above the submedian.

Expanse, 3 to $3\frac{3}{4}$ inches.

HABITAT.—Ceylon.

This species is similar in colour and pattern to the Ceylonese *Crastia Asela* and to *Pademna Sinhala*, but may be distinguished from them in the male possessing two sexual marks on the forewing, and in the female also having two elongated streaks on the underside above the submedian vein.

DISTRIBUTION.—It has been captured at Galle, Rambodde, and Kandy, and by Mr. F. M. Mackwood in the Navalpittia country.

ALLIED INDO-MALAYAN SPECIES OF NARMADA.—The only other known species of this genus is *N. consimilis* (Felder, Reise Novara, Lep. ii. p. 329, 1867), a female of which is in the collection of Messrs. Godman and Salvin. *Habitat.* Java and Sumatra.

The following allied genera and species also occur within the Indo-Malayan area, namely:—*Nacamsa simillima* (Moore, P. Z. S. 1883, p. 310; Semper, Reisen Archipel. Philippen. Lep. p. 32, pl. 4, fig. 1, 2, 3, ♂ ♀ (1886). *Habitat.* Luzon, Philippines.—*N. Meldola* (Moore, P. Z. S. 1883, p. 310; Semper, Reisen Archipel.

Philippen. Lep. p. 32, pl. 4, fig. 4, 5, 6, ♂ ♀ (1886). *Habitat.* Mindanao, Philippines. *Anadara Gamelia* (Hübner, Samm. Exot. Schmett. ii. pl. 10, fig. 1, 2 (1806-27); *Syn.* E. Faber, Zinken-Sommer, Nova Acta Akad. N. C. 1831, p. 186, pl. 16, fig. 18, 19, ♂ ♀; E. Lorraini, Chapman, Etom. Mo. Mag. 1873, 263, ♀. *Habitat.* Java.

Genus STICTOPLŒA.

Stictoplaea, Butler, Journ. Linn. Soc. Zool. xiv. p. 301 (1878). Moore, Proc. Zool. Soc. Lond. 1883, p. 319.

Euplaea (sect. *E.*), Distant, Rhop. Malayana, p. 36 (1882).

Euplaea (*Stictoplaea*, sect. *C*, part), Marshall and De Nicéville, Butt. of India, i. p. 90 (1882).

IMAGO.—Male. Wings broad. *Forewing* lengthened-triangular, costal margin slightly arched, apex somewhat rounded; exterior margin oblique and slightly convex, posterior margin slightly convex; upper discocellular with a very short spur emitted within the cell. *Two broad lengthened sexual marks* between the lower median and submedian vein, each mark on the upperside, when first examined under the 'binocular,' having the illusive reticulated appearance, both marks being clothed with widely-separated short oval bluntly-bidentate or tridentate-tipt scales, and on the underside both marks are clothed with regularly-disposed short round-tipt ribbed scales, with a few intervening very narrow white scales and here and there a very slender white projecting scale. *Hindwing* broad, with the costal margin much arched in the middle, exterior margin convex, waved.

Type.—*S. gloriosa*.

STICTOPLŒA HARRISI (Plate 52, fig. 1, 1a, ♂ ♀).

Euplaea Harrisii, Felder, Reise Novara, Lep. ii. p. 328 (1867), ♂.

Stictoplaea Harrisii, Moore, Proc. Zool. Soc. Lond. 1883, p. 320, pl. 30, fig. 6, ♂.

Euplaea Grotei (♀ only), *Felder, Reise Novara, Lep. ii. p. 339, pl. 41, fig. 7, ♀.

Stictoplaea Grotei, Butler, Journ. Linn. Soc. Zool. xiv. p. 302 (1878). Moore, Proc. Zool. Soc. Lond. 1878, p. 824.

Euplaea (*Stictoplaea*) *Grotei*, Marshall and De Nicéville, Butt. of India, i. p. 91 (1882).

Euplaea Grotei, Distant, Rhopal. Malayana, p. 36, pl. 3, fig. 3, ♂ (1882).

IMAGO.—Male. Upperside. *Forewing* dark velvety blue-black, brilliantly glossed throughout with steel blue; a submarginal row of generally clearly-defined pale violet-blue small round spots, and a lower marginal row of minute spots. *Two elongated broad silky-black sexual marks* between the lower median and submedian vein, both clothed with widely-separated short oval bluntly-bidentate or tridentate-tipt scales. *Hindwing* dark violaceous-brown, costal border glossy cinereous, clothed with widely-disposed broad spear-pointed scales; a prominent submarginal

* The butterfly described by Dr. Felder, *l. c.*, as the male of his *Euplaea Grotei*, is a species of the genus *Isamia*. See I. Grotei, p. 132, *ante*.

row of small slightly ovate spots, and a marginal row of smaller rounded white spots. Underside dark violaceous-brown. *Forewing* with a small pale violet-blue costal spot, one at lower end of the cell, a discal spot between the upper and middle median veinlets, and sometimes two smaller upper discal spots, a larger paler lower discal spot between the middle and lower medians, and a submarginal and marginal row of minute white spots, which are generally obsolete anteriorly. *Sexual marks* pale brown, both clothed with regularly-disposed short round-tipt ribbed scales, with a few intervening very narrow white scales and here and there a very slender white projecting scale; posterior margin glossy-cinereous. *Hindwing* with both marginal rows of spots as above, and also a small violet-blue spot at end of the cell, and a discal series of six small spots. Some white spots at the base of the wing. Body dark brown; head, palpi, thorax above and beneath black, spotted with white; legs black, fore femora white beneath; abdomen beneath with grey bands. Female. Upperside as in the male, excepting that the forewing is straight along the posterior margin, and in the absence of the sexual marks. On the underside the forewing has an elongated pale streak above the pearly-grey posterior margin.

Expanse, ♂ $3\frac{1}{4}$, ♀ 4 to $4\frac{1}{2}$ inches.

HABITAT.—Tenasserim, Lower Burma.

Dr. Rogenhofer, the Custodian of the Vienna Museum of Zoology, has kindly favoured us with a coloured drawing of the type specimen of Felder's *E. Harrisi*, of which the illustration on our plate 52, fig. 1, is a copy. Specimens of this species had previously been identified as representing *E. Grotei* of Felder, an erroneous identification which arose from Felder having erroneously figured the female of our present species (*Harrisi*) as representing that sex of the *E. Grotei*. The male of the latter named species (*Grotei*) is described as possessing only *one sexual mark* on the forewing.

DISTRIBUTION.—This species has been taken in Moulmein in June. Mr. Otto Limborg (P. Z. S. 1878, 824) took it in Upper Tenasserim, at Ahsown, above Ahsown, and from Hatseiga to HOUNGDURAN. "Capt. C. T. Bingham obtained numerous specimens in the autumn in the Thoungyeen forests" (Butt. Ind. 92). It has been taken in the Mepley Valley in October. Major C. H. E. Adamson (Notes on the Danainæ of Burma (1889), p. 14) records the capture of one male at Mepley in February, one male in June at Moulmein, and four males and two females in July at Hpa An, all in Tenasserim. These are the only specimens taken of this rare insect, and it does not appear to extend further north than the Tenasserim district. Its caudal appendages are light brown. Messrs. Elwes and de Nicéville (J. A. S. Beng. 1887, 416) notice the capture of several specimens at Tavoy and Sinbyoodine. Dr. J. Anderson (J. Linn. Soc. Zool. 1886, 31) records its capture in the Mergui Archipelago in "December and January."

Felder's type specimen is recorded as from Cochin-China, and Mr. Distant (Rhop. Malay. 36) describes it from specimens captured at Malacca.

STICTOPLÆA CROWLEYI (Plate 52, fig. 2, ♂).

IMAGO.—Male. Upperside. *Forewing* brilliantly blue-glossed and with submarginal and marginal pale blue spots as in *S. Harrisii*, except that the former series are a little larger. *Hindwing* with three very small upper submarginal white spots, as in *S. binotata*. Underside. *Forewing* with a small violet-white costal, cell, upper discal, and two lower discal spots, and very minute submarginal and marginal spots. *Hindwing* with a very small violet-white cell spot, five discal spots, a submarginal and a marginal row of very small spots.

Expanse, ♂ $3\frac{3}{4}$ inches.

HABITAT.—Tenasserim.

This is an intermediate form between *S. Harrisii* and the Sumatran *S. tyrianthina*, the latter differing on the upperside of the forewing in being deep violet-brown without the blue gloss, in the submarginal spots increasing in size towards the apex, and in the total absence of marginal spots. The type specimen is in the collection of Mr. Philip Crowley.

STICTOPLÆA HOPEI (Plate 53, fig. 1, 1a, ♂ ♀).

Euplexa Hopei, Felder, Reise Novara, Lep. ii. p. 328 (1867), ♂.

Stictoplexa Hopei, Butler, Journ. Linn. Soc. Zool. xiv. p. 302 (1878). Moore, Proc. Zool. Soc. Lond. 1883, p. 319.

Male. Comparatively smaller and with narrower forewings than in typical specimens of *S. binotata*. *Forewing* with the spots similar but somewhat smaller. *Hindwing* with a complete row of prominent white submarginal spots, the marginal spots nearly obsolete, except three very minute dots in the middle. Female. Upperside. *Forewing* marked as in the male, except in the absence of the sexual marks and the posterior margin being straight. *Hindwing* with a submarginal and marginal row of white spots.

Expanse, ♂ $3\frac{1}{2}$, ♀ 4 inches.

HABITAT.—Silhet, Khasia Hills, Naga Hills.

STICTOPLÆA BINOTATA (Plate 53, fig. 2, 2a, ♂ ♀).

Stictoplexa binotata, Butler, Journ. Linn. Soc. Zool. xiv. p. 302 (1878). Moore, Proc. Zool. Soc. Lond. 1883, p. 319, pl. 30, fig. 4, ♂.

Euplexa (Stictoplexa) Hopei, Marshall and de Nicéville, Butt. of India, i. p. 92, pl. 9, fig. 18, ♂ ♀ (1882).

IMAGO.—Male. Upperside. *Forewing* dark velvety blue-black, brilliantly glossed with steel-blue; a small pale violet-blue costal spot, one within lower end of the cell, a discal series of five spots which are more or less dentated, the three upper

with the point inward, the two lower with the point outward, the lowest sometimes ill-defined; a submarginal row of large pale-blue spots, the lower being broadly quadrate or pyriform, the upper more rounded, and a marginal row of very small spots. *Two silky long sexual marks* between the lower median and submedian vein. *Hindwing* dark rufescent-brown, the costal border broadly glossy cinereous-white; with generally three, sometimes only two, very small prominent white upper submarginal spots. Underside paler rufescent-brown. *Forewing* with the costal, cell, discal, and marginal rows of spots as in upperside, all prominent violet-white, the upper discals being smaller and slender, the lower discal larger and oval, the submarginals reduced nearly to the size of the marginals; sexual marks brown, posterior border brownish-cinereous. *Hindwing* with a small violet-white cell spot, six small discal spots, three or four small upper submarginal spots, and a nearly complete marginal row of very small white spots. Some white spots at base of the wing. *Body* dark brown; head, palpi, thorax above and beneath black, spotted with white; legs black, fore femora white beneath; abdomen beneath with greyish segmental bands. Female. Upperside. *Forewing* with the posterior margin straight; the pale blue markings as in male, but generally larger, the discal row sometimes lobular and with a lower streak above the submedian. *Hindwing* as in the male; in some specimens two small bluish-white discal spots are present. Underside marked as in the male. *Forewing* with two elongated violaceous-white streaks above the submedian vein; posterior margin cinereous.

Expanse, ♂ $3\frac{1}{2}$ to $4\frac{1}{4}$, ♀ $3\frac{3}{4}$ to $4\frac{1}{4}$ inches.

HABITAT.—N. E. India, Sikkim.

DISTRIBUTION.—This is probably the northern form of the preceding. Mr. L. de Nicéville (J. A. S. Bengal, 1881, 55), obtained it in Sikkim in October, it being by no means a common butterfly. Mr. H. J. Elwes (Trans. Ent. Soc. 1888, 302) says it is "found not uncommonly in Sikkim up to about 3000 feet elevation from April to October."

All the specimens of both *S. Hopei* and *S. binotata* that we have examined are from the localities cited. It is recorded by Major C. H. E. Adamson, in his Notes on the Danainæ of Burma (1889), p. 14, that, what he considers to be *S. Hopei* "is common in the North of Burma. I have caught it close to Akyab town, on the coast, in March, and it flies commonly in April in the Arrakan Hill tracts as high as 2000 feet, and probably higher. In the hills about Bhamo it is also found rarely, and I have one caught in Rangoon in March. The caudal appendages of the male are of a light brown colour."

STICTOPLÆA PYGMÆA (Plate 52, fig. 3, 3a, ♂ ♀).

Stictoplaea pygmæa, Moore, Proc. Zool. Soc. Lond. 1883, p. 320.

Allied to *S. microsticta*. Smaller in size: *forewing* in both sexes with smaller

discal spots and larger submarginal spots, the latter series triangular in form in the male and somewhat confluent with the lower discal series in the female, the marginal dots being more distinct: the cell spot is also larger. *Hindwing* in male with three upper submarginal minute white spots only, the female, besides these submarginal spots also showing indistinct marginal spots.

Expanse, ♂ 3, ♀ $3\frac{1}{2}$ inches.

HABITAT.—Cachar.

This is probably only a variety of *S. Hopei*. The allied *S. microsticta* is a broader winged insect in both the fore and hind wings.

STICTOPLÆA REGINA (Plate 53, fig. 3, ♂).

Stictoplaea regina, Moore, Proc. Zool. Soc. Lond. 1883, p. 319, ♂.

IMAGO.—Male. Comparatively smaller than typical *S. binotata*; *forewing* of a violet-blue with less gloss; submarginal spots half the size of those in that species, the discal spots reduced to the two between the radial and middle median, and a very minute spot at lower end of the cell. *Hindwing* deep rufous-brown, immaculate.

Expanse, ♂ $2\frac{1}{2}$ inches.

HABITAT.—Cachar.

This also is probably only a variety of *S. Hopei*.

MIMICK OF INDIAN SPECIES OF STICTOPLÆA.—The male of the Elymniine butterfly *Dyctis Patna*, and the male of the Papilionid *Isamiopsis Telearchus* are excellent mimicks of *Stictoplaea binotata*.

INDO-MALAYAN ALLIED SPECIES OF STICTOPLÆA.—*S. microsticta* (Butler, Journ. Linn. Soc. Zool. xiv. p. 302 ♂ (1878). *Habitat.* —? The locality of this species is unknown. We have seen only the type specimen, which is described as having the ‘upperside of the forewing like *S. Hopei*, except that it is larger, all the spots are considerably smaller, and the purple shot is less livid. *Hindwing* with only the three first of the discal series of white spots.” Type in coll. British Museum.—*S. picina* (Butler, P. Z. S. 1866, p. 280, pl. 30, fig. 1, ♂). *Habitat.* Sumatra.—*S. inconspicua* (Butler, Journ. Linn. Soc. Zool. xiv. p. 302, ♂). *Habitat.* Sumatra. In coll. British Museum.—*S. Lacordairei* (Moore, P. Z. S. 1883, p. 321, ♂). *Habitat.* Java. In coll. Hewitson, British Museum.—*S. latifica* (Butler, P. Z. S. 1866, p. 292, pl. 29, fig. 3, ♀). *Habitat.* Philippines.—*S. Dufresneyi* (Godart, Enc. Méth. ix. p. 815 (1816); Semper, Reisen Archipel. Philippen Lep. p. 23, pl. 6, fig. 6, 7, 8, ♂ ♀ (1886). *Habitat.* Philippines.—*S. Swinhoei* (Wallace, P. Z. S. 1866, p. 358). *Habitat.* Formosa.

Subfamily II.—SATYRINÆ.

- Satyrinæ*, Bates, Journ. Ent. 1861, p. 220; Trans. Linn. Soc. Zool. 1862, p. 515; Journ. Ent. 1864, p. 176. Butler, Catal. Fabrician Lep. B. M. p. 8 (1869). Kirby, Syn. Catal. D. Lep. p. 36 (1871). Moore, Lep. Ceylon, i. p. 13 (1880). Distant, Rhopalocera Malay. p. 37 (1882). De Nicéville, Butt. India, etc. i. p. 95 (1883). Semper, Reisen Archipel. Philippen, i. p. 34 (1886). Seudder, Butt. E. U. States, i. p. 115 (1888).
- Satyrī*, Fabricius, Ent. Syst. 111, i. p. 214 (1793). Latreille, Gen. Crust. et Ins. xiv. p. 97 (1805).
- Satyridæ*, Swainson, Cabinet Cycl. pp. 86, 93 (1840). Doubleday and Westw. Gen. D. Lep. p. 352 (1851). Wallace, Trans. Ent. Soc. 1853, p. 261. Trimen, Rhop. Africæ Austr. p. 184 (1866). Butler, Catal. Satyr. B. M. p. 1 (1868). Staudinger, Catal. Lep. Eur. p. 22 (1871). Kirby, Eur. Butt. p. 27 (1882).
- Satyrides*, Boisdual, Spec. Gén. Lep. p. 166 (1836). Ind. Méth. Eur. Lep. p. 25 (1840). Rambur, Faune Ent. Andal. Lep. p. 292 (1839). Duponchel, Catal. Méth. Lep. Eur. p. 11 (1844).
- Satyrites*, Blanchard, Hist. Nat. des Ins. ii. p. 456 (1840).
- Satyridi*, Stephens, Catal. Brit. Lep. B. M. p. 6 (1850). Stainton, Manual Brit. Butt. i. pp. 21, 25 (1857).
- Satyroidæ*, Lederer, Verh. Zool. Bot. Ver. Wien (1852), pp. 16, 23. Wallengren, Lep. Scandinaviæ, p. 6 (1853). Guenée, Lep. d'Eure-et-Loire, p. 25 (1867-75).
- Satyritæ*, Lucas, Chenu's Encycl. Hist. Nat. Papillons, p. 176 (1853).
- Satyriden*, Schaatz, Exot. Schmett. p. 26 (1885).
- Satyrina*, H. Schäffer, Lep. Exot. p. 55 (1858); Prod. Syst. Lep. p. 12 (1864). Plötz, Syst. der Schmett. Mitth. Vorpomm. xvii. p. 6 (1886).
- Hipparchiides*, Westwood, Butt. of G. Brit. 2nd Edit. p. 39 (1855). Kirby, Manual Europ. Butt. p. 45 (1862).
- Oreades*, Borkhausen, Natur. der Eur. Schmett. i. p. 63 (1788). Hübner, Tentamen, i. p. 1 (1806), Verz. bek. Schmett. p. 52 (1816). Seudder, Syst. Rev. Amer. Butt. p. 4 (1872).
- Pratores et Dictatores*, Herbst, Nat. Syst. Ins. viii. p. 7 (1796), ix. p. 159 (1798).
- Thysanuriform Stirps* (pars) Horsfield, Catal. Lep. E. I. C. p. 48 (1828-9).
- Lymaciformes* (pars) Newman, British Butt. p. 19 (1871).
- Furcula*, Guenée, Lep. d'Eure-et-Loir, p. 25 (1867-75).
- Ragadina*, H. Schäffer, Prod. Syst. Lep. p. 15 (1864).

CHARACTERS OF THE SATYRINÆ.

IMAGO.—“Of medium size. *Body* generally small and weak. *Head* of moderate size, front tumid, protuberant below. *Antennæ* inserted in a common, transverse hollow, separating the front from the vertex, very slender, scaled, straight, as long or longer than the abdomen, the limits of the club ill-defined, occupying from one-fourth to one-half of the apex in a gradually enlarging area. *Palpi* slender, the clothing nearly all in a vertical plane, giving it the appearance of considerable compression. *Thorax* moderately slender, compressed. *Forewing* produced somewhat at the apex to a well-rounded angle, generally slightly full at the border which is seldom angulated or even wavy; costal vein greatly swollen at the base; first and generally also the second subcostal veinlets arising just before the apex of the

cell, the other two at some distance beyond; the inferior branches are much as in the *Nymphaliuæ*; discoidal cell usually at least half the length of the wing, closed by distinct veins; median vein often swollen at the base, the branches equidistant, the first arising at the middle of the cell, the last at its tip, which curves towards the subcostal veinlets; submedian vein sometimes swollen at the base; internal veinlet absent. A very anomalous distribution of the veins of the forewing, both at the costal and inner margins, is shown by Mr. Wood-Mason to occur in the genus *Parantirrhæa*. *Hindwings* not generally smaller than the forewings, broadly rounded, generally without tails, angles, or more than slight crenulations; inner border forming a gutter for the reception of the abdomen; costal vein terminating at about the middle of the outer half of the anterior border; subcostal vein taking its rise apparently as a dependent of the costal vein, its lower branch curving strongly at base toward the median; cell closed by a slender vein, connecting the lower subcostal veinlet just beyond its initial curve to the last branch of the median at its curve, directed outward from the subcostal toward the median veinlet; the branches of the median vein arise further from the base of the wing than the corresponding ones of the subcostal vein, the terminal one curving to receive the [discocellular] vein closing the cell; submedian vein terminating at the anal angle; internal vein terminating at about the middle of the inner border. *Forelegs* very small, variable in division and armature; the male tarsi consist of a single joint sometimes divided by sutures into from three to five unarmed articulations; in the female they are divided into four or five joints, sometimes unarmed, sometimes with apical spurs, and sometimes with scattered spines only. *Male abdominal appendages*:—Upper organ provided with a hook as long as or longer than the centrum and generally as long as or longer than the clasps; also, with a pair of slender, tapering, backward-directed appendages on the sides; clasps pretty long and slender, at least four times as long as broad, tapering on the apical half, and generally becoming very slender." (Scudder, Butt. E. U. S. i. 115, 1888.)

EGG.—"Subspherical, flattened at the base, and rounded, though usually slightly flattened at the summit; the sides full and broadest below the middle, usually in the middle of the lower half; covered either with very inconspicuous cells or with very numerous, delicate, longitudinal ribs; surface minutely granulose; micropyle composed of minute angular cells; increasing a little in size outwardly and separated by delicate raised lines" (Scudder). Mr. W. Doherty, who is the only entomologist who has paid attention to the study of the eggs of Indian butterflies, characterizes those of the *Satyrinæ* (*Journ. Asiat. Soc. Bengal*, 1886, 109) as follows:—"Egg about as high as wide, a little more or a little less, rather small, hard, typically translucent, and smooth or with obscure polygonal facets, sometimes subradiate, or even (*Aulocera*) with distinct, broadly-scalloped, anastomosing ribs, somewhat as in

Hesperia. In some species it is covered with calcareous (?) accretions which do not appear till after some days' exposure to the atmosphere."

CATERPILLAR AT BIRTH.—"Abdomen tapering very slightly and regularly from in front backward, the last segment often showing little or no sign of its subsequent bifurcation; body furnished above, on either side, either with two rows, or with a double row of clubbed appendages, one placed anteriorly and one posteriorly on each segment; the sides with another row, formed of a single appendage, placed centrally above the spiracles of each segment, and, beneath another double row, its members not quite in a line—all seated on papillæ."

ADULT CATERPILLAR.—"Head well rounded, smaller than the largest part of the abdomen, although not always of a less size than the first thoracic segment, with no protuberances, excepting on the summit, which sometimes bears on either side a long, straight, conical horn. Body nearly or quite cylindrical, largest at or in advance of the middle, tapering more or less toward each end, the terminal segment longitudinally forked, each fork extending backward as a conical projection, often of considerable length. Surface of the body profusely studded with papillæ, each giving rise to a very short hair; ornamented with longitudinal coloured bands, some of which are frequently composed of oblique dashes, one to a segment; the segments are cut by transverse incisions, usually into six sections, the front one the largest, the last incision frequently obscure; legs and prolegs short but not very stout.

CHRYSLIS.—"Head scarcely at all or but little produced in front; the anterior curve of the thorax very high; ocellar prominences often not at all pronounced; abdomen broadly rounded, not deeply separated from the thorax, the lower surface of the body nearly straight, slightly and broadly curved; the whole body well rounded, with a few or no tubercles excepting the slight projections at base of the wings; edges of the wings very slightly raised above the level of the body and not at all thickened at the border, but generally carinate from the wing tubercle backward." (Scudder, l. c. p. 115.)

GENERAL CHARACTERISTICS AND HABITS.—"Among the Nymphalidæ, the butterflies of this subfamily present a very distinctive appearance. Their sombre hues, almost always inclining to dark brown; their markings, mostly confined to round ocellated spots upon the underside and to some extent upon the upperside, near and parallel to the outer margin—oftenest occurring in the lower subcostal and lower median interspaces; together with the delicate texture of the membrane of the wings, the suppleness of the veins, which are usually inflated at the base (a character, however, not found in some genera and shared by some genera in neighbouring subfamilies); and the excessive atrophy of the forelegs in the males—all combine to separate these insects from those of any other large group. There is no doubt that in many cases

the sombre markings in this group are instances of protective resemblance, the under-side of the hindwings being marbled or mottled with darker and lighter colours, in such a way as to render the insect very difficult to see when alighted, for instance, upon a gray rock. That this is its purpose, is indicated, not only by the invariable habit of insects of this subfamily to alight with closed wings, showing only their under surface, but their very common trick of immediately dropping the front wings into concealment between the hinder pair, and also of tipping over to one side and resting in a half reclining posture, the gray wing against the gray rock.

"The caterpillars may be readily recognized by the peculiar bifurcation of the terminal segment of the body; they are almost invariably clothed only with a short but coarse pubescence arising from papillæ so numerous as to give a shagreened appearance to the skin, and longitudinally striped with continuous or broken bands of colour. Mr. Distant rightly considers this a form of protective colouring, and even looks upon the forked tail as in some measure protective, and on type of larva as a 'very primitive form.' He remarks (*Rhopalocera Malayana*, p. 37) that 'they are almost all feeders on various grasses, to which their green coloration and markings assimilate them, thus affording a good example of "protective coloration."' In an evolutionary sense there are also ample grounds for considering them as exhibiting a very primitive form. Dr. Weissmann ('Studies in the Theory of Descent,' Engl. edit.) has made the most profound and philosophical study of larval characters, principally as found in the *Sphingidæ*, a family which strongly exhibits more or less specialized larval markings. He considers the oldest *Sphinx* larvæ as being without markings and probably protected only by adaptive coloration and a large caudal horn, &c. It is at least probable that the bifid tails of the *Satyrinæ* fulfil an analogous protective function with this caudal horn in the *Sphingidæ*, or with the forked horn at the tails of the larvæ of some genera of moths. With the next stage of Sphingid evolution, where the larvæ have become longitudinally striped, we may almost apply Dr. Weissmann's very words to the *Satyrinæ* :—'The caterpillars thus marked must have been best hidden on those plants in which an arrangement of parallel linear parts predominated; and we may venture to suppose that at this period most of the larvæ of the *Sphingidæ* lived on or among such plants (grasses).'

"The caterpillars eat slowly and are very long in attaining maturity; and as the egg and chrysalis states are usually longer than common, the species of this group are almost without exception single brooded,* and, in the genus *Cœneis*, some species are supposed to take two years to complete the cycle of growth. So far as is known, the larvæ feed only on grasses and sedges (the only exception known to me is the European *Cænonympha tiphon*, the caterpillar of which is said by Merrin to feed on *Rhynchospora*, one of the *Cyperacæ*). It is probable that the larvæ of

* See subsequent remarks on "Seasonal Dimorphism" in this subfamily.

nearly all the species hibernate. M. Marloy, who seems to have been more successful in finding the larvæ of the European species than any one else, obtained them all in the months of March, April, and May (Ann. Soc. Ent. France, vii. pp. 263-7 (1838). Prittwitz also states (Stett. Ent. Zeit. xxii.) that all European species, except two, probably or certainly winter in the larval stage, and these exceptional insects, curiously enough, are almost the only ones which are double-brooded." (Scudder, l. c. p. 115.) According to Mr. L. de Nicéville (Butt. India, i. 95 (1883) "the larvæ feed only during the night."

"In this subfamily are found some curious and instructive exceptions to the general rule of pupation among the Nymphalidæ, a family which, as is well known, suspend themselves by the hinder extremity during the chrysalis state. In certain European species, whose transformations were first studied by M. Marloy, the caterpillar goes beneath the ground to pupate, and forming a large oval cocoon or cell, composed of grains of earth connected by a little silk, undergoes its transformations therein without suspending or attaching itself in any form whatever. In one of our [N. American] species of *Eneis* we have an even more extreme case. In another European species, *Melanargia galathea*, Mr. Bates informs us, Messrs. Hellins and Buckler have found the chrysalis lying on the ground between stems of grass, the shrivelled skin of the larva remaining attached to the hinder extremity of the chrysalis. Both Dr. Boisduval and Mons. Duponchel give a similar account of it, but Hübner represents it as suspended. Mr. Edwards has recently bred the species in this country [N. America] from specimens sent over, and had an experience similar to that of Messrs. Hellins and Buckler. But besides this insect, we know of at least eight European species, mostly referred to *Satyrus*, but some to *Epinephele* and *Pararge* as well, the chrysalids of which are not suspended; and so far as yet appears these all belong to the species of *Satyrinæ* which have vertically ribbed eggs. Most of the species, however, whose transformations are known, suspend themselves after the manner of other Nymphalidæ.

"The butterflies of this subfamily may be further distinguished by their peculiar flight, which is of a feeble, wavering, dancing character and not long sustained; neither do the insects rise far above the ground. Mr. R. Trimen (Rhopal. Africæ Austr. p. 185) says he has 'noticed that those species which do not possess the basal inflation of the veins of the forewings possess greater powers of flight and a more robust structure generally.' Mr. A. R. Wallace, in writing of the species found on the Amazons, says (Trans. Ent. Soc. Lond. (2) ii. p. 261) he 'does not remember to have ever seen any species rise four feet from the earth, while the greater number of them do not exceed as many inches.' They are shade-loving insects. 'They chiefly affect the glades and lanes of the woods, being not often seen in the clearing; sometimes, however, they come into our gardens of a morning, but then they fly

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along close to the ground, beneath the shrubs and in the shelter of the fence, as if shade were more congenial than sunshine. Perhaps as there is a correspondence and a harmony in all the divine works, there may be a reference to these retiring habits in the dull tints common to the tribe and the want of those glowing colours so general among butterflies' (Gosse, *Alab.* 55, 56). Dr. Thwaites also (*Moore, Lep. Ceylon*, i. p. 13), speaking of the subtropical *Satyrinæ*, says that 'their movements are more lively in the early morning and evening during their amatory gambols,' and Mr. de Nicéville remarks (*Butt. of India*, i. p. 104) that the hundred or more species of *Mycalasis* 'seldom take flight unless disturbed, except toward evening.'

"In certain features the *Satyrinæ* show some curious resemblance to the *Hesperidæ*. The eggs of the ribbed species closely resemble those of the *Hesperidi* in general appearance; the caterpillar at birth has a similarly large and striking head, and occasionally the terminal segments of the body are armed with much longer cuticular appendages than elsewhere, a common feature among the *Pamphilidi*; the mature caterpillar is sluggish in motion, with a somewhat flattened belly and short prolegs, giving a limaciform body, which is clothed with pile only; the chrysalis is unusually rounded and occasionally is not suspended, and the imago often has an oblique patch of raised hairs or scales on the upper surface of the forewings concealing the androconia, which remind one strongly of the similar stigma one often finds in the *Pamphilidi*. That these peculiarities have some phyletic meaning it is impossible to doubt, but they should not be allowed to overshadow or in any way to conceal the great body of characteristics by which this group forms a part of the great and varied family *Nymphalidæ*.

"Allusion has just been made to the androconia or male scales occurring sometimes in this subfamily; with the exception of the *Euplocinæ* and the *Argynnidi* this is the only group of *Nymphalidæ* in which they are frequently present; and so far as known they possess here the uniform character of exceedingly attenuated scales with a tasselled tip. They by no means occur in all genera, and sometimes show no external sign of their presence; they are generally found upon the upper surface of the front wings, and often in the form of an oblique stigma. In some Asiatic species, according to Dr. Thwaites (*Moore, Lep. of Ceylon*, i. p. 13) they are found as 'a pair of curious pencils of hair which each lie within a fold of the upper wing, and which are capable of being spread out radiately during the insect's flight.' I am not aware that any odour has been detected in any of them; I have been able to detect none in our two [*N. American*] species of *Æneis*. About half our [*N. American*] species possess no androconia." (*Scudder*, l. c. p. 115.)

"The *SATYRINE* are connected on the one hand with *Euplocæa* through *Zethera* [*Euplocæmima*], a very aberrant form; and on the other hand with *Elymnia*

through *Melanitis* and *Parantirrhæa*. The genera are structurally very closely related to each other; but in addition to the structural distinctions, each genus exhibits a distinctive style of coloration and markings, which though sometimes difficult to define, is generally unmistakable to the experienced eye; thus, in *Mycalesis*, the underside almost invariably has a straight transverse band across the middle of both wings, with a more or less prominent series of ocellated spots beyond it; in *Lethe*, the basal area on the underside is usually either irregularly or not at all variegated; while in *Zophoessa* it is usually ornamented with straighter transverse lines; in *Hipparchia* [*Eumenis*] and the allied groups the upper surface is usually brown, variegated with yellowish brown; in *Aulocera* the upper surface is black with a white transverse common stripe; in *Erebia* [*Paralasa*] the upper side is dark brown, sometimes with ferruginous patches and an ocellus at the apex of the forewing; in *Ypthima* the upper surface is more uniform lighter brown, and the ocellus at the apex in it and in *Callerebia* is always bipupilled. Many of the genera comprise but a single species, such as *Anadebis*, *Orinoma*, *Cyllogenes*, and *Parantirrhæa*; others again have only one representative within Indian limits, such as *Zethera* [*Euplocæmima*], *Pararge* [*Lasiommata*], *Erites*, *Æneis* [*Paræneis*], and *Ragadia*, or only two or three, such as *Cœlites*, *Neorina*, *Rhaphicera*, and *Zipætis*; the genera which contain the greatest number of species, such as *Mycalesis*, *Lethe*, and *Melanitis*, have been recently divided off into several groups, some of which depend, as in the case of the divisions of [the old genera] *Danais* and *Euplocæ*, on the presence and position of scent-pouches and tufts of hair on the wings of the male insect." (de Nicéville, Butt. Ind. i. 95.)

SEASONAL DIMORPHISM:—Mr. de Nicéville in Proc. Asiatic Society of Bengal, December, 1884, writes, "During the last nine years I have collected butterflies in Calcutta, and have always noted the months in which I met with the different species. In this way I became aware that certain closely allied species [of *Mycalesis*, *Melanitis*, *Ypthima*, and *Junonia*] occurred at particular seasons only, and when these species were grouped together according to the time of the year they were met with, it became apparent that those which occur in the rains were strongly ocellated forms, whilst those occurring at other seasons had the ocelli reduced to mere rudiments, or were absent altogether. Why the wet season should beget a generation of 'eyed' butterflies, and the dry season a generation of 'eyeless' forms, I am quite unable to offer a conjecture. In addition to the absence or presence of ocelli, some of these species present other seasonal differences. In *Mycalesis perseus* and *M. mineus*, on the underside in the rains generation the discal white line is very prominent, it is obsolete in the dry season generation; and on the latter form of *M. mineus*, the forewing is much more produced at the apex, making the outer margin straighter. In the dry season form of *Melanitis Leda* the forewing is more falcate, and the underside is not striated."

In the Journ. Asiat. Soc. Bengal, 1885, p. 39, Mr. de Nicéville further says, "The constancy of this phenomenon is such that I cannot help thinking there must be some physical reason for it,—can it be a protective one? The difference in the garb of the surrounding vegetation makes it little remarkable that a change should be found in the coloration of the butterflies of the two seasons, but it is difficult to see why this change should show itself in the obliteration or development of ocelli. The only hypothesis which I can suggest is, that during the rains the density of the vegetation is such that the butterflies can easily hide their conspicuous ocelli, while in the cold and dry seasons the ocelli, easily seen through the scantily-clothed jungle, would render the butterflies an easy prey to their inveterate enemies the birds, lizards, and insectivorous insects; so that the ocellation being a cause of danger would have a worse chance of survival, and consequently would be gradually wiped out by a process of a survival of the fittest, the fittest in this case being the least gaudily-marked individuals. Were this the case, however, the non-marked forms would certainly survive during the rains, for their homeliness of coloration, though no longer absolutely essential, would still give them an advantage over their ocellated brethren, unless indeed the ocelli are preserved by sexual selection at this time when the struggle for bare existence is not so keen as at other seasons."

In a subsequent paper (Journ. Asiat. Soc. Bengal, 1886, p. 229), Mr. de Nicéville gives the life history of certain species of Calcutta Satyrinæ, of the genera *Mycæstis*, *Ypthima*, and *Melanitis*, and states that he has "been able to prove by breeding direct from the egg, that the extraordinary seasonal dimorphism which he had previously suspected to occur does actually exist," and gives the details of the rearing of the species therein described, which, up to that date, he had succeeded in obtaining for breeding. The life history of these dimorphic species will be found described under the genera above referred to.

Later on Mr. de Nicéville writes (Journ. Asiat. Soc. Bengal, 1888, 273), "With regard to many of the Indian Satyrinæ, they are divided into two strongly-marked well-defined groups, which I have designated dry and wet-season forms respectively. These forms *prevail* during their respective seasons, but are by no means strictly confined to them. For instance, it is a common occurrence in India to have what is called a 'break in the rains,' when for many successive days the weather is somewhat similar to that obtaining in the dry season. It may be noted that the Calcutta year is roughly divisible into a cold season, extending from the middle of October to end of March; a hot season, extending from April to middle of June; and a wet season or rains, from the middle of June to the middle of October. Any larvæ turning to pupæ during a 'break' would almost certainly, though they would emerge perhaps a week afterwards in a deluge of rain, be of the dry season form. Similarly, during the dry season, dry season forms prevail, but, should a

rainy day or two come, pupæ formed during the wet interval would probably produce the wet season form of butterfly. Again, as it takes butterflies some little time to lay their eggs (after having completed this operation they die immediately) it must frequently happen that the two forms overlap:—a dry season female not having laid her eggs during the dry season would do so at the beginning of the rains, and though caught in the rainy season, would still be a dry-season butterfly, its worn appearance, if nothing else, proclaiming the fact; and *vice versâ* with a wet season butterfly, not having completed her laying during the rains, and caught in the dry season.”

On the subject of seasonal dimorphism in Indian butterflies of this subfamily, Mr. W. Doherty (Journ. Asiatic Society of Bengal, 1886, p. 105) gives us the result of his more extended observations, and says, “So far as my four years’ experience goes, there are four broods of Indian tropical and subtropical butterflies; two in the wet season—in May or June and in August or early September, and two in the dry season—in October or late in September and in the first warm weather of March, respectively. These periods vary in different localities, the amount of rainfall being the chief cause of change. In Kumaon, where I spent less than six months, I cannot be sure how many broods of butterflies occur there or in what months they appear; the second wet season brood, a numerous one, appeared from the middle to the end of August, and the first dry season brood, less important, especially in the drier valleys, came out in the last week of September, my first specimen of *Mycalesis visala* having been taken September 22nd. In Travancore, there was a small brood of dry-season forms early in March, and a very large one in the second week of May. In Orissa and Ganjam, the first wet-season brood did not appear till the end of July (the monsoon coming late that year), and was poor in numbers. In the Chittagong Hill tracts, the last dry-season brood, including a vast number of species and of specimens, appeared in the middle of March, while the first wet-season brood, both there and in Arakan, came out at the end of May, and was a very small one. At Bassein, Burma, the first dry-season brood, which, as I have said, appeared in Kumaon near the end of September, was delayed till the middle of November. All butterflies do not have four broods. A few seem to keep coming out at short intervals throughout the year; many are found only in the wet season, and some perhaps only in the dry season. It is said that still others are found in but one month of the year, and so have only one brood instead of four. Nevertheless, I think I may generalize my experience into the brief statement that there are four broods, two of the wet, two of the dry season, each of them simultaneous with or preceding by a month the beginning and the end of the season after which I have named them.

“Between the two broods of dry-season butterflies (October and March), and

between the two broods of wet-season butterflies (May—June and August—September), I have never observed any difference. But between specimens of the wet and dry-season broods there are in many genera very perceptible differences. There is a difference in size, the wet-season specimens being generally smaller, and there are minor differences in the angulation of the wings and in the tone and purity of the colouring below. But the most remarkable difference is in the presence of large eye-like spots on the underside of the wet-season forms, either absent or greatly reduced in those of the dry season. To give an example, the Sarju Valley was on September 20th full of ragged specimens of a strong-ocellated butterfly (*Mycalis mineus* proper), which a week later was succeeded by swarms of a larger, more angulate, non-ocellate insect (*Myc. visala*), precisely similar in its structure, and especially in those very complex organs, the prehensores, which in general mark by strong differences the slightest specific variations. In the same way *Melanitis Leda* was succeeded by the non-ocellate *Mel. Ismene*, and *Junonia Asterie* by the non-ocellate *J. Almana*. Such facts are best studied in countries where the wet and dry seasons are well marked, and there is none better than Travancore, where in 1882-3 I first observed these curious metamorphoses. Hitherto I have only found them to exist in *Junonia*, *Ypthima*, *Melanitis*, and in the following groups of *Mycalis*—*Calysime*, *Orsotriena*, *Telinga*, *Gareis*, *Virapa*, and *Samanta*. Many genera of the Satyridæ seem to produce only the two wet-season broods, and so fail to show what variations the weather would produce in their markings. Again, some dry countries produce only the dry forms, and some wet countries only the wet forms. For instance, I believe that Sindh produces only the dry-weather form *Junonia Almana*, while the wet climate of Ceylon and Singapore produces only *J. Asterie*. In dry Orissa, the wet and dry forms of *Orsotriena Medus* and *O. Runeka* are tolerably distinct, and the latter is the commoner of the two. But on the damp Malabar Coast, of the representative forms *Orsotriena mandata* and *O. mandosa*, the latter, the dry-weather one, is scarce and imperfectly differentiated. The cause of this seasonal dimorphism would be a curious subject of study, but I have no suggestions to offer myself. Mr. de Nicéville has recently observed to me that perhaps, owing to the rank vegetation of the rainy season, the butterflies are better concealed, and have therefore been free to assume these handsome spots, under the influence, perhaps, of sexual selection. This view is, I think, somewhat strengthened by certain facts. The dry season forms are all more or less leaf-like in shape and colouring, while in the wet-season ones there is no such mimicry. This argues greater exposure to danger in the dry season. Remembering, however, the remarks of Darwin and Wallace on the protective nature of the ocelli of birds, borne out by the testimony of all sportsmen, and observed by me in the case of the common wild Peacock, I am inclined to think that the ocelli are a direct protection to the insect during the rains. Certainly that is likely to be the

case in the Himalayas, insectivorous birds being especially numerous there during the south-west monsoon, when the ocellate type of butterfly prevails."

Mr. Doherty (J. A. S. Bengal, 1889, 118) gives us some subsequent observations which he made on the Upper Assam frontier between August and December, and in other parts of the East, stating that "The season was a very poor one, the cold weather commencing earlier than usual. The dry-season, non-ocellate brood of *Mycalesis*, *Melanitis*, *Junonia*, &c., appeared about the end of September, and none but rubbed and ragged individuals of the wet-season brood were seen flying after that date. My theory of the effect of drought and humidity (somewhat like that of heat and cold on certain European species) on the shape and ocellation of these butterflies has now received confirmation from various sources. In Eastern Java and the neighbouring islands of Sumba, Sambawa, and Timor, the seasons are the reverse of those in India, the winter months—December, January and February—being the rainy ones. I found the broods of the Satyridæ similarly reversed there, the wet-season form coming out late in the autumn, and the dry-season one in the spring. This is of course only indirect evidence, but direct evidence has not been wanting. Mr. de Nicéville, who early adopted my views on this subject, some time ago reared *Mycalesis mineus* from the eggs of *M. visala*, and has lately bred both forms of *Melanitis Leda* under natural conditions from the eggs of the ocellate one. This, however, took place at the time of the change of monsoon. At any other time it must be very unusual for both forms to come from the same parent. Two years ago, in the early part of the dry season in the island of Sambawa, I succeeded in obtaining both *Melanitis Leda* and *ismene* from the eggs of *Leda* by keeping a wet sponge in the box in which the former species was reared. I particularly recommend this experiment to naturalists living in the East, as *Melanitis* lays its eggs with unusual facility in captivity, and the larva feeds on young growing rice, which is always obtainable. . . . It was perhaps the general destruction of forests in the long-settled parts of the East—India, China, Java—whether by the agency of nature or by that of prehistoric man, that gave rise to seasonal dimorphism in the Satyridæ. In the wet, dark woodland, their ocelli served them as a protection. Then came the change; the country was partly deforested, and, instead of the former uniformly damp climate, there was a long dry season in which the rank vegetation withered, the sunlight entered everywhere, and the ocellate butterflies were rendered conspicuous. Some species disappeared from the regions thus affected, while others lost their ocelli and assumed the angular shape and dull neutral colouring of dry leaves, and so survived. In the less variable climate of the equatorial regions, this has rarely taken place, and generally only the ocellate broods are found there. And in desert regions, instances may perhaps occur where the ocellate form has altogether disappeared."

On this interesting subject Mr. G. F. Hampson, in his "Notes and List of the Butterflies of the Nilgiris" (Journ. Asiat. Soc. Bengal, 1888, 347) states that "most of the species have four broods, two in the dry season and two in the wet season; but some species have only the two wet-season broods. Seasonal dimorphism is rather difficult to study on the Nilgiris, owing to the fact that the Western and North-western Slopes get heavy rains during the South-west monsoon and hardly any during the North-east; while the Eastern and South-eastern Slopes have their wet season during the North-east monsoon and get little of the South-west; and, consequently, the wet and dry-season broods are some three months later in appearing on the Southern and Eastern Slopes than on the Western and Northern, and the two forms get much mingled in the intermediate districts, which partially get both monsoons."

GEOGRAPHICAL DISTRIBUTION.—"This subfamily is more widely spread over the globe than any other similar group of butterflies, being universally present wherever butterflies occur. Its members extend to the polar colds and alpine summits, and embrace several genera peculiar to such regions. Yet, wherever they occur, the Satyrinæ can be recognized by their peculiar facies, and have nowhere lost their characteristic flight and habits." (Scudder, l. c. p. 121.) Of the genera occurring within our limits "some few are purely Indian; others are Asiatic and Malayan; and again, others belong only to the Palæarctic region, and occur within our limits only in the mountains on the North and West." (de Nicéville, Butt. Ind. i. 97.)

Key to the Indian Genera of SATYRINÆ.

- I. Hindwing with the apex of the cell at, or close to, the origin of the middle median veinlet, usually appearing as if the latter were a continuation of the lower discocellular veinlet.
 - A. Palpi clothed in front with short dense *appressed* hairs.
 1. Forewing with the costal vein only scarcely perceptibly swollen at the base; the eyes naked.
 - a. Hindwing short, rounded, without ocellated spots. EUPLAGMINA.
 - b. Hindwing rather elongate, rounded, with ocellated spots on upper and underside. ANADEBIS.
 - B. Palpi clothed in front with moderate or rather short *porrect* hairs.
 2. Forewing with the median and submedian vein usually much swollen at the base in addition to the swollen costal vein, but variable. The *eyes hairy*, except in *Orsotriana*, where 'they are naked. [In the type of the genus *Mycalesis* (*M. Evadne*)—an African species—the eyes are also naked.] Males with one or more scent-pouches, or androconial patches, on the upperside of the wings. [Mycalesis, Auctorum.]
 - 1a. Males with an *androconial patch and tuft of hairs* on upperside of both the *fore and hindwings*.
 - a. Males with the *androconial patch and tuft on hindwing* near to the subcostal vein, and overlapped by the forewing; the costal, median, and submedian veins of *forewing* much swollen at the base. The *eyes hairy*.

- a1. With the *androconial patch* of scales, on the middle of the submedian vein of *forewing*, partly covered by a tuft of long fine hairs.
- a. With the first subcostal veinlet of *hindwing* of male much curved upwards at base, then straight; the second very concave from base of first to end of cell VIRAPA.
- b. With the first subcostal veinlet of *hindwing* of male swollen at base, and covered on the upperside by a tuft of hairs. GARERIS.
- a2. With a slight tuft of hairs, but *no perceptible androconial patch* of scales on the submedian vein of *forewing* beyond the swollen base. The first subcostal veinlet of *hindwing* of male not curved at base, the second concave at base and much swollen beneath between base of first and end of the cell SADARGA.
- b. Males with *no* erectile tuft on the *hindwing* near base of subcostal vein; but with *two recumbent tufts* along median vein—one on each side. The *eyes naked*. The costal vein only swollen at base in *forewing* ORSOTRIENA.
- IIb. Males with an *androconial patch* and *tuft of hairs* on upperside of *hindwing only*, near to the subcostal vein, and overlapped by the *forewing*. The *eyes hairy*.
- A. With the first subcostal veinlet in *hindwing* emitted at some distance before end of the cell.
1. With the middle median veinlet in *hindwing* emitted at end of the cell.
- a. The discocellular veinlets of *forewing* very concave; *hindwing* with a tuft of hairs at base of the costa overlaying the swollen *sub-costal* vein and covering the *androconial patch* of scales CALYSISME.
- b. The discocellular veinlets of *forewing* straight; *hindwing* with the tuft of hairs at base of costa short and not overlaying the swollen *sub-costal* vein TELINGA.
- c. The *forewing* broad and short; the outer margin concave PACHAMA.
2. With the middle median veinlet in *hindwing* emitted at some distance before end of the cell.
- a. The *forewing* elongate, the outer margin concave CULAPA.
- b. With the first subcostal veinlet in *hindwing* emitted immediately before end of the cell; the middle median veinlet emitted *before* end of the cell KABANDA.
- c. With the first subcostal veinlet in *hindwing* emitted at end of the cell.
- a. With the middle median veinlet in *hindwing* emitted at end of the cell. SAMANTA.
- b. With the middle median veinlet in *hindwing* emitted at some distance *beyond* end of the cell NISSANGA.
- Ic. Males with *two androconial patches* and *tufts of hairs* on upperside of *hindwing*, one being placed near the subcostal vein and overlapped by the *forewing*, the other on the submedian vein. The *eyes hairy* LOESA.
- SURALATA.
- II. *Forewing* with the costal vein perceptibly, the subcostal and median scarcely perceptibly swollen at base.
- IIA. The *eyes naked*; the hindwings subangulate or caudate NEORINA.
- CÆLITES.
- IIb. The *eyes hairy*.
- a. Hindwing usually angulate, often caudate; the underside much variegated.

1. Male with a long narrow *androconial* patch of scales on upperside of *forewing*, placed below the median vein; apex of the cell in *hindwing* beyond the origin of middle median veinlet.
 - a. Male with an *androconial* patch of scales on upperside of *forewing* placed on either side of the middle of submedian vein, and a conspicuous *tuft of long hairs* on upperside of *hindwing* on the base of middle median veinlet RANGBIA.
 - b. Male with a *tuft of long hairs* on *hindwing* placed between the lower and middle median veinlets NEMETIS.
 - c. Male with an elongated *tuft of hairs* on upperside of *forewing* placed between the median and submedian veins. *No tuft on hindwing* HANIPHA.
 2. Male *not possessing* the *androconial* patch of scales on *forewing*, nor the tufts of hairs on *hindwing*.
 - 2a. Apex of cell in *hindwing* at the origin of middle median vein.
 - a. Male with *forewing* narrow and elongate, triangular, outer margin concave; *hindwing* with a rather long narrow tail DEBIS.
 - b. Male with *forewing* short and broad, triangular, outer margin slightly concave; *hindwing* with short broad obtuse tail LETHE.
 - c. Male with *forewing* broad, triangular; *hindwing* broad, outer margin angular DIONANA.
 - 2b. Apex of cell in *hindwing* beyond the origin of middle median veinlet.
 - a. Male with *forewing* short, broad, outer margin very slightly oblique and convex; *hindwing* not caudate TANSIMA.
 - b. Male with *forewing* short, outer margin convex; *hindwing* broad, outer margin convex CHONALA.
 - c. Male with *forewing* short, triangular; *hindwing* broad, outer margin convex, sinuous SINCULA.
 - d. Male with *forewing* triangular; *hindwing* broad, outer margin caudate CHARMA.
 - b. Hindwing rounded or slightly quadrate; markings of the underside much the same as on the upperside ZOPHOESSA.
 - BLANAIDA.
 - ORINOMA.
 - RHAPHICERA.
- III. Forewing with the costal vein greatly, and the median vein slightly swollen at base; the *eyes hairy* LASIONMATA.
- AMECERA.
- II. Hindwing with the apex of the cell considerably beyond the origin of the middle median branch (except in Ragadia). *Eyes in all naked*.
- A. Palpi clothed in front with *long porrect* hairs.
- I. Forewing with the costal and median veins swollen at the base, except in Melanargia, Aulocera, Pargeneis, and in many species of Ypthima, in which the swelling is scarcely perceptible in the median vein.
- a. Hindwing with the abdominal margin not incised; the outer margin scalloped; club of antenna broadly spatulate MELANARGIA, EUMENIS, PHILARETA, CHAZARA, NYTHA.
- b. Forewing with the veins scarcely swollen at the base; the outer margin of hindwing scalloped; club of antenna slender AULOCERA, PARGENEIS, KARANASA, KANETISA.

- c. Hindwing with the abdominal margin incised; the outer margin scalloped near anal angle MANIOLA, CHORTOBIUS.
 d. Hindwing with the abdominal margin slightly incised; the outer margin even.
 The second subcostal branch in the forewing *originating beyond the cell* . . . YPTHEMA.
 THYMIPA, KOLASA.

II. Forewing with the costal vein only swollen at the base.

- A. With the wings broad and rounded; the outer margin even, or very slightly sinuate in hindwing.
 a. Forewing with the costal margin much arched from the base . . . CALLEREZIA, PARALASA,
 HEMADARA.
 b. With no ocellated spots visible on the upperside, except by transparency;
 those of the underside prominent ZIPETIS.
 B. With the wings rather elongate, somewhat denuded of scales.
 a. Hindwing with the lower discocellular veinlet close to the base of the wing.
 The second subcostal branch in the forewing *originating beyond the cell* . . . RAGADIA.
 b. Forewing with the outer margin concave, of the hindwing dentate and slightly caudate ERITES.
 B. Palpi clothed in front with short dense *appressed hairs*, and perceptibly tufted behind.
 The veins of the forewing not swollen at the base; the hindwing caudate.
 a. Forewing with the submedian vein reaching the posterior angle, and the lower median branch reaching the outer margin considerably above it . . . MELANITIS.
 CYLLOGENES.
 b. Forewing with the submedian vein short and curved, and the lower median branch terminating at the posterior angle PARANTIRREIA.

Genus EUPLCEAMIMA.

Euplceamima, Holland, Trans. American Entom. Soc. 1887, p. 113.

IMAGO.—*Forewing* triangular; costa much arched, apex rounded, posterior angle also rounded, hind margin slightly recurved; costal vein thickened from the base; cell very broad; two subcostal branches emitted from close to end of cell; discocellulars outwardly oblique; upper radial starting from extremely close to subcostal, lower radial at one-third from upper end of discocellular; median branches widely separated; submedian vein wavy from the base. *Hindwing* broadly ovate; outer margin rounded in the male, very slightly scalloped in the female; cell sub-fusiform; discocellular long, outwardly oblique and recurved; middle median veinlet emitted close to end of the cell; submedian and internal vein slightly recurved. *Palpi* erect, reaching above the vertex, clothed with appressed hairy scales, apex pointed. *Antennæ* slender, scarcely thickened towards the end, joints acutely defined. *Eyes* prominent, naked.

Type.—*E. Henrici* (Holland).

This genus is quite distinct from *Zethera*. *Euplceamima* has a less triangular

forewing than in typical *Zethera* (*Z. pimplea* of Erichson, Nova Acta Acad. Nat. Cur. 1833, tab. 50, fig. 5), the costa is more arched, the apex hardly rounded, the exterior margin less oblique and the posterior margin longer. The hindwing in *Euplocæmima* is also longer, the exterior margin considerably more rounded and less scalloped. In the forewing the cell is longer, and broader; the discocellulars more outwardly oblique; the cell in the hindwing also much longer, and the discocellular much more oblique.

EUPLOCÆMIMA DIADEMOIDES (Plate 54, fig. 1, 1a, ♂).

Zethera diademoides, Moore, Proc. Zool. Soc. Lond. 1878, p. 824, pl. 51, fig. 3, ♂. Marshall and de Nicéville, Butt. of India, etc., i. p. 98, pl. xiv, fig. 33, ♂ (1883).

IMAGO.—Male and female. Upperside dark purpurescent-brown. *Forewing* with a submarginal series of seven small bluish-white (sometimes olivescient-white) spots, which decrease in size towards the costa; a marginal row of much smaller spots disposed in pairs between the veins, and usually a trace of an inner marginal row of lunular spots; the submarginal spots are either all rounded in shape, or the lower are cordate and the upper are excavated on the outside, and the outer marginal row are also either oval or irregularly triangular in shape. *Hindwing* with a submarginal series of six prominent, larger, oval, similar coloured spots, of which the second and third lower are the largest, and the upper the smallest; an inner and outer marginal row of smaller prominent spots, disposed in pairs between the veins, of which the inner row are somewhat triangular in shape and laterally opposed to each other, the outer row being narrower and more linear in form. Underside exactly as above. *Body* dark brown; sides of head and of the palpi white. Abdomen beneath pale ochreous-brown.

Expanse, 3 to 3½ inches.

HABITAT.—Upper Tenasserim.

DISTRIBUTION.—The type specimens were taken by Mr. Otto Limborg, during the expedition of 1876-7 to Upper Tenasserim, at Taoo, 3000 to 5000 feet elevation, and at Moolai 3000 to 6000 feet. Capt. C. T. Bingham also took it in March, April, and May, and again in the autumn, in the upper and lower Thoungyeen forests in Upper Tenasserim.

ALLIED INDO-MALAYAN SPECIES.—The Rev. W. F. Holland has described and figured (Trans. Amer. Ent. Soc. 1887, 113, pl. 1, fig. 1) an allied species from the Island of Hainan under the name of *Eupl. Henrici*, which he says differs from *E. diademoides* in that the submarginal band of the forewing has seven spots instead of six, and that there is another band of four white spots crossing the apex of the forewing, transversely between the submarginal band and the cell.

Genus ANADEBIS.

Theope, Moore, Catal. Lep. Mus. East India Comp. i. p. 234 (1857).—*Preoccupied*.

Ethope, Moore, Proc. Zool. Soc. 1865, p. 770.

Anadebis, Butler, Annals and Mag. Nat. Hist. xix. p. 50 (1867). Marshall and de Nicéville, Butt. of India, etc., i. p. 99 (1883).

IMAGO.—Wings large. *Forewing* subtriangular; costa extremely arched, apical angle rounded, outer margin nearly straight and slightly oblique, posterior angle rounded, posterior margin nearly straight; costal vein thickened at the base and decreasing gradually to half its length; cell very broad; first and second subcostal branches emitted near end of cell, third from the end of cell, fourth at half length from below the third, fifth at one-third from below the fourth; discocellulars outwardly recurved; upper radial starting from close to the subcostal, lower radial about one-third from upper end of discocellular; median branches widely separated; submedian waved. *Hindwing* broadly ovate; outer margin slightly scalloped; costa much arched; precostal veinlet long; subcostal vein straight to near end of the cell; cell elongated, subfusiform, broad across the middle, pointed at ends; discocellular outwardly-oblique and terminating close to but immediately beyond the middle median; radial emitted at one-third from upper end; middle median branch emitted immediately before end of the cell; submedian scarcely straight; inner vein recurved. *Palpi* elongate, erect, reaching nearly level of vertex; first and second joints clothed with laxly appressed hairs, third joint pointed, naked. *Antennæ* long, apex of the joints acute, slender, with scarcely perceptible club. *Body* hairy, abdomen short. *Eyes* projecting, naked.

ANADEBIS HIMACHALA (Plate 54, fig. 2, 2a, ♂ ♀).

Mycalesis (*Theope*) *Himachala*, Moore, Catal. Lep. Mus. E. I. Company, i. p. 234 (1857).

Ethope Himachala, Moore, Proc. Zool. Soc. 1865, p. 770.

Anadebis Himachala, Butler, Annals and Mag. Nat. Hist. xix. p. 51, pl. ii. fig. 1 (1867). Marshall and de Nicéville, Butt. of India, etc., i. p. 99, pl. xiv. fig. 35, ♀ (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 303.

Neorina Sita, Felder, Wien. Ent. Monats. iii. p. 403 (1859).

IMAGO.—Male. Upside dark umber-brown, somewhat virescent in some lights, palest along the outer margins and on the forewing before the apex. *Forewing* with a row of six large, contiguous, prominent submarginal black ocelli, each with a white pupil and pale ochreous-brown outer ring; sometimes there is an additional small upper ocellus between the two last subcostal branches, the entire row being contiguously bordered on each side by a pale ochreous-brown lunular line, and also externally by two outer similar coloured lines; the cilia being also of the same pale colour. *Hindwing* with five submarginal similar ocelli; the lowest

one being bipupilled with white; the bordering lunular line and outer marginal lines, with the cilia being pale ochreous brown, as in the forewing. *Underside* somewhat paler; the ocelli more prominent, the bordering lunular line and marginal lines more strongly defined, paler, and sometimes distinctly virescent-grey. On the hindwing there is a sixth larger similar ocellus, situated at the upper end before the apex.

Female. Upperside paler, and of a more olivaceous tint, especially before the apex of the forewing, where there is an outwardly-curved narrow pale fascia; ocelli somewhat larger and the markings also paler; the upper ocellus on the hindwing being sometimes visible, but when so apparent it is only of the normal small size. Underside with the bordering lunular line of the row of ocelli, and the inner marginal line, and also the apical oblique fascia pale virescent-grey; ocelli on the hindwing larger than in the male. *Body* dark brown, paler beneath; anal claspers ochreous; antennæ reddish; sides of the palpi pale brownish-ochreous.

Expanse, ♂ $2\frac{7}{8}$, ♀ $3\frac{3}{8}$ inches.

HABITAT.—N. E. India.

DISTRIBUTION.—Occurs in Sikkim, Assam, the Khasia Hills, Silhet, and Cachar. It is common in the autumn, and probably at other seasons. "Mr. J. Wood-Mason took it commonly in Cachar, in May, July, and August." (de Nicéville, Butt. India, i. p. 99.) "Not uncommon in Sikkim up to about 4000 feet, from April to October." (Elwes, l. c. p. 303.)

HABITS.—"This is a butterfly that occurs only in thick forests, very seldom venturing out into the sun, and even then never far from the shelter of large trees." (Wood-Mason and de Nicéville, J. A. S. Bengal, 1887, 348.)

Genus VIRAPA.

Virapa, Moore, Trans. Ent. Soc. Lond. 1880, p. 155.

Mycalopsis (*Virapa*), Marshall and de Nicéville, Butt. of India, etc. i. p. 104 (1883).

IMAGO.—*Forewing* with the costa arched in the middle, apex convex, exterior margin oblique and even, posterior angle acute; costal, subcostal, and median vein swollen at the base; first subcostal branch emitted immediately before end of the cell; discocellulars bent inward at their middle; radials from upper near the end. *Male* on the upperside with an oval glandular patch of raised scales situated on each side of the middle of the submedian vein, the patch being partially covered by an overlapping tuft of fine long hairs which are exerted outward from each side of the vein. *Hindwing* bluntly oval; exterior margin convex; the subcostal vein in the male much curved upward from near the base and thence proceeding straight to the apex, the branch emitted at more than half distance before end of the cell and very

concave to end of the cell; upper discocellular outwardly convex, lower straight and oblique, radial from their middle; two upper median branches emitted at a short distance beyond end of the cell. *Male* above with a tuft of fine long hairs exerted from below the base of the subcostal vein and overlapping a small glandular patch of scales above the first branch. *Eyes* very slightly hairy. *Antennæ* with a well-formed slender club. *Palpi* uniformly pilose beneath the tip.

Type.—V. *Anaxias*.

VIRAPA ANAXIAS.

Mycalesis Anaxias, Hewitson, Exot. Butt. iii. p. 86. *Myc.* pl. 4, fig. 25, 26 (1862), ♂. Butler, Catal. Satyr. Brit. Mus. p. 141 (1868). Distant, Rhop. Malay. p. 416, pl. 36, fig. 7, ♂ (1886).

Virapa Anaxias, Moore, Trans. Ent. Soc. Lond. 1880, p. 156.

Mycalesis (Virapa) Anaxias, Marshall and de Nicéville, Butt. of India, etc. i. p. 106, pl. xvi. fig. 54, ♂ (1883).

WET-SEASON BROOD (Plate 55, fig. 1, 1a, b, ♂ ♀).

IMAGO.—**Male.** Upperside dark olivescient ochreous-brown, with a paler submarginal and marginal lunular line. *Forewing* with a subapical oblique narrow lilacine-white band, and a conspicuous tuft of black hairs overlapping an iridescent glandular patch of raised scales situated on each side of the middle of the submedian vein. *Hindwing* with a tuft of yellowish radiating hairs exerted from below the base of the subcostal vein and overlapping a small glandular patch of nacreous white scales situated above the first branch. Underside. *Forewing* darker brown from the base to the subapical oblique lilacine-white band and outwardly beyond the middle, thus forming an angular discal transverse edge to the dark basal area, the marginal border being much paler brown. *Forewing* with two small apical prominent black ocelli superposed above the oblique white band, and a larger ocellus between the middle and lower median veins, each ocellus with a pure white pupil and ochreous-yellow outer ring; beyond these are two submarginal lunular yellowish ochreous lines and an outer marginal straighter dark line; the inner submarginal line and the lower outer-edge of the dark basal area usually being lilacine-grey. *Hindwing* with the basal area darker brown, the broad marginal border paler, edged with lilacine-grey; marginal lunular lines either lilacine-grey or ochreous; traversing the border are seven small similar prominent black ocelli, of which the four upper and the two lower are the smallest, the fifth always the largest, the fourth and seventh sometimes reduced to a pale speck. Cilia lilacine-grey.

Female. Somewhat larger and paler; the oblique subapical white band of the forewing broader on both the upper and underside; the lower ocellus of the under-

side of the forewing and the larger one on the hindwing sometimes show through on the upperside. *Body* beneath, palpi, and legs pale olivescens-brown.

Expanse, ♂ $1\frac{7}{8}$, ♀ 2 inches.

DRY-SEASON BROOD (Plate 55, fig. 1, c. ♂).

Male and female. Larger than the wet-season form. Upperside somewhat paler, the apical oblique band on the forewing whiter in colour, and broader. Underside also paler, especially from the base of the wings, and of an ochreous-brown tint, the transverse discal line of the basal area more sharply defined and outwardly edged with diffused lilacine-grey; the marginal border much paler ochreous. *Forewing* with the oblique apical fascia lilacine-white and broadly diffused externally; ocelli indicated by minute white dots. *Hindwing* with the ocelli also minute, the second, third, and fourth upper being indicated by white dots.

Expanse, ♂ $2\frac{1}{8}$, ♀ $2\frac{4}{8}$ inches.

HABITAT.—S. India (Nilgiris, Trevandrum, Travancore); Sikkim; Assam; Khasia and Naga Hills.

DISTRIBUTION.—On the Nilgiris, Mr. G. F. Hampson obtained it at 3000 to 5000 feet elevation in heavy forest; not common, August and March (J. A. S. Beng. 1888, 348). Mr. H. Fergusson took it in the Ashambo Hills, Travancore, not uncommonly in March and May at 3000 to 4000 feet (Butt. Ind. i. 106). The dry-season form has been taken in Travancore at 1500 feet in April. In Sikkim, Mr. de Nicéville obtained it in October at 2000 feet (Butt. Ind. i. 106). Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 304) says it is "not uncommon in the hot valleys of Sikkim up to 3000 feet during the greater part of the year." It is also recorded from Assam, the Khasia and Naga Hills. In Cachar, Mr. J. Wood-Mason (J. A. S. Beng. 1887, 348) says "one male was taken near Silcuri in August, and another on Nemotha Peak in September." In Burma, Dr. N. Manders (Tr. Ent. Soc. 1890, 517) records the capture of a single specimen in the Shan States near Thibaw in February. Captain Bingham took it on the Donat range in Upper Tenasserim in January and October (Butt. Ind. i. 106), and Mr. O. Limborg (P. Z. S. 1878, 825) obtained it at Ahsown; and Moolai 3000 to 6000 feet. Major C. H. E. Adamson (List of Burmese Butterflies, p. 6) records it from Moulmein and Arakan in April. Mr. W. Doherty obtained the dry-season form in E. Pegu at 500 to 2000 feet in March and April. Mr. W. L. Distant (Rhop. Malay. 416) records the wet-season form from Perak, Malay Peninsula.

VIRAPA RADZA (Plate 55, fig. 2, 2a, ♂, ♀).

Mycalesis Radza, Moore, Proc. Zool. Soc. 1877, p. 583, pl. 58, fig. 2, ♂.

Virapa Radza, Moore, Trans. Ent. Soc. Lond. 1880, p. 156.

Mycalesis (Virapa) Radza, Marshall and de Nicéville, Butt. of India, etc. i. p. 105 (1883).

IMAGO.—Upperside dark brown; marginal lines indistinctly paler, with the inter-

vening submarginal line darker. *Forewing* with a narrow oblique subapical white band, below which is a large prominent black ocellus with white pupil and ochreous outer ring, and a very small similar ocellus sometimes present above the white band; a slender tuft of black hairs overlapping a glandular patch on each side of the middle of the submedian vein. *Hindwing* with a very small indistinct ocellus between the middle and lower median veins. A glandular tuft of yellow hairs radiating from below the base of the subcostal vein over a nacreous costal patch of scales. Underside with the basal area darker; marginal lines ochreous. *Forewing* with the oblique subapical lilacine-white band, a prominent large lower-submarginal ocellus and two obliquely-disposed apical smaller ocelli, each with a bright ochreous outer ring and minute white pupil. *Hindwing* with a submarginal series of seven similar prominent ocelli, the four upper and the two lowest being the smallest, the fifth very large and more oval in shape; outer edge of dark basal area wavy, lilacine bordered and with a more or less dentate lilacine mark above the upper median vein. *Body* brown above, paler beneath; legs and palpi ochreous-brown.

Female somewhat larger, and paler. Upperside. *Forewing* with the oblique subapical white band twice the width of that of the male; the small upper ocellus plainly defined, the lower ocellus larger and more prominent. *Hindwing* with a small ocellus between the middle and lower median veins; submarginal line blackish. Underside. *Forewing* with the subapical white band prominent; two small prominent oblique apical ocelli and a large lower ocellus as in the male, marginal lines ochreous; outer edge of basal area lilacine and dilated posteriorly. *Hindwing* with the ocelli larger than in male; marginal lines broader and ochreous; edge of basal area irregularly but broadly lilacine bordered.

Expanse, ♂ $1\frac{3}{4}$, ♀ 2 inches.

HABITAT.—South Andamans.

DISTRIBUTION.—“This species has only as yet been taken in the vicinity of Port Blair in the South Andamans, in May, June and July.” (de Nicéville, l.c. p. 106.)

VIRAPA MANII.

Mycalesis (Virapa) Manii, Doherty, Journ. Asiatic Society of Bengal, 1886, p. 257, ♀.

IMAGO.—“Female. Upperside fuscous. *Forewing* with the white band wider than in any allied species, and almost crossing the apex. *Hindwing* unmarked except by two submarginal lines obscurely darker. Underside paler brown; a broad dull violet band across the disc of hindwing, unmarked with white, its inner border nearly straight. This band is obscurely visible on the lower part of the forewing, not extending to the white band; below the white band one large ocellus, above it two apical ocelli set obliquely, the upper many times the larger, the ochreous rings

of the two confluent. *Hindwing* with seven ocelli, the fourth blurred, the third smallest, the fifth as large as all the others united. Margin with an ochreous brown, and an obscure violet line bordered by dark lines. Cilia dark.

"Expanse, 57 millimetres."

HABITAT.—Nicobars.

"The absence of the ocellus on the forewing above, and the violet band of the underside unmarked with white distinguish *Manii* from the female of the Andamanese *Radza*. From the female of the wet-season brood of *Anaxias* (India) it differs on the underside in the uniform paler and more ochreous brown of the base; in the great breadth of the white band which extends almost to the end of the cell; in the very unequal ocelli, in the absence of the lilac gloss discally and submarginally; and in the darker apex, and obsolescent discal band of the forewing." (Doherty, l.c. 257.)

DISTRIBUTION.—"One female taken at Gonyi, Great Nicobar; two females at Ikuya, Little Nicobar." (Doherty, l.c. p. 257.)

Genus SAMUNDRA.

IMAGO.—Male. Differs from *Virapa* (*V. Anaxias*) in its broader and more rounded wings. *Forewing* with the costa comparatively shorter, more convex, the apex more obtuse, and the exterior margin almost erect and convex, thus giving this wing a much less triangular shape; the submedian vein is much curved downward from the end of the swollen base, and the hairy tuft over the glandular patch on the upperside is situated above the submedian (not above and below it, as in *V. Anaxias*), the hairs of the tuft also are pale brown, not black as in the latter species. *Hindwing* with the cell much broader in the middle; the subcostal vein starting further from the base of the costal, the branch of the subcostal is also emitted further from the base and curves downward and outward; the discocellular starts from near the base of the branch (not at about one-third from its base as in *V. Anaxias*), the discocellular is therefore nearly twice its length and is very outwardly oblique, its upper end being much curved. In the female the discocellular of the hindwing starts from the junction of the two subcostals—not at some distance beyond the base of the branch, as in *V. Anaxias*. The *palpi* are comparatively longer, straighter, and somewhat porrected. *Antennæ* much longer, with a more slender, longer, and narrower club.

SAMUNDRA ANAXIOIDES (Plate 55, fig. 3, 3a, b, ♂ ♀).

Mycalesis Anaxioides, Marshall and de Nicéville, Butt. of India, etc. i. p. 107 (1888).

IMAGO.—Male. Upperside brown, darkest basally; marginal lines pale. Cilia cinereous-brown. *Forewing* with a narrow slightly-excurved whitish subapical band;

a very ill-defined large ocellus slightly visible between the middle and lower median veins; a small tuft of yellowish hairs overlapping a glandular patch situated above the middle of the submedian vein. Hindwing with a glandular tuft of yellowish radiating hairs exerted from below the subcostal vein over a cinereous patch of scales, the space below the patch, outside the cell, being blackish. Underside. Both wings with the basal two-thirds or more, dark brown, the marginal border being ochreous and sprinkled with cinereous atoms. Ocelli on both wings disposed further from the margin than in *V. Anaxias*. Forewing with the oblique fascia very ill-defined, suffused, and ochreous-white; a submarginal row of six minute black ocellate-dots; posterior border broadly glossy-cinereous. Hindwing with a submarginal row of seven minute black ocellate spots.

Female. Upperside paler; marginal line also paler. Forewing with the oblique subapical band broader; a small apical and a large lower ocellus slightly defined. Underside with the basal area and outer border also paler. Both wings with minute ocelli as in the male. Body brown above; paler beneath; palpi and legs ochreous-brown.

Expanse, ♂ $2\frac{3}{8}$, ♀ $2\frac{4}{8}$ inches.

HABITAT.—Upper Tenasserim.

DISTRIBUTION.—“Captain C. T. Bingham obtained males in the lower Thoungeen forests in Upper Tenasserim, in May, and both sexes in March. It appears to affect lower elevations than does *V. Anaxias*.” (de Nicéville, Butt. India, p. 107.) Major C. H. E. Adamson (Catal. Butterflies of Burma, 1889, p. 7) records the capture of “two specimens flying over a stream on the road between Myawaddee and Kaukarit, Upper Tenasserim, in February.” A single male, from Tavoy, is recorded by Mr. Elwes (J. A. S. Beng. 1887, 418).

Genus GARERIS.

Gareris, Moore, Trans. Ent. Soc. Lond. 1880, p. 156.

Mycalesis (*Gareris*), Marshall and de Nicéville, Butt. of India, etc. 1, p. 107 (1883).

IMAGO.—Wings broader than in *Virapa*. Forewing more angular at the apex, the costa much more arched. Male with the venation and the glandular patch of raised scales and overlapping tuft similar. Hindwing with the first subcostal branch swollen on the underside at its base, above the cell, and covered on the upperside by a glandular patch of scales and overlapping tuft of ochreous hairs; the two upper median branches emitted from end of the cell. Eyes hairy.

Type.—G. Sanatana.

GARERIS SANATANA.

WET-SEASON BROOD (Plate 56, fig. 1, 1a, b, ♂, ♀).

Mycalesis Gopa, Felder, Reise Novara, Lep. iii. p. 501 (1867). Butler, Catal. Satyridæ Brit. Mus. p. 140 (1868).*Gareris Gopa*, Moore, Trans. Ent. Soc. Lond. 1880, p. 157.*Mycalesis (Gareris) Gopa*, Marshall and de Nicéville, Butt. of India, etc. i. p. 107 (1883).

IMAGO.—Male. Upperside dark brown; marginal lines pale ochreous-brown. *Forewing* with a small subapical distinct black ocellus, ringed with ochreous, between the radials, sometimes with a minute ocellule attached below it and another above it; a large ocellus also between the middle and lower median veins; a prominent tuft of black hairs overlapping a glandular patch of scales situated above and below the middle of the submedian vein. *Hindwing* with a tuft of ochreous hairs exerted over the swollen glandular patch of black scales at the base of the first subcostal branch. Underside paler, and of an olivescient ochreous-brown tint. *Forewing* with a prominent transverse, discal, narrow pale lilac band, which is sharply defined on its inner edge and diffused outwardly; generally with three, sometimes only two, small submarginal anterior ocelli, and a large median ocellus as on upperside, the latter occasionally with an attached upper minute ocellus or only a white dot; iridescent nacreous posterior patch prominent. *Hindwing* with seven submarginal prominent ocelli, of which the second and third upper and the two lowest are the smallest. Marginal lunular lines pale lilacine-ochreous.

Female. Upperside. *Forewing* with a larger subapical and much larger median ocellus, the former sometimes with a minute attached one above it. *Hindwing* with an indistinct small ocellus between the middle and lower median veins. Underside with the transverse lilacine band broader, and the marginal lunular lines also broader; with similar prominent but larger ocelli than in male. *Body* dark brown above, paler beneath; legs and palpi pale ochreous-brown. *Antennæ* with ochreous-yellow tip and blackish band.

Expanse, ♂ $1\frac{3}{4}$ to 2, ♀ 2 to $2\frac{1}{4}$ inches.

DRY-SEASON BROOD (Plate 56, fig. 2, 2a, b, ♂ ♀).

Mycalesis Sanatana, Moore, Catal. Lep. Mus. E. I. Company, i. p. 231 (1857). Butler, Catal. Satyr. Brit. Mus. p. 138 (1868). Elwes, Trans. Ent. Soc. Lond. 1888, p. 305.*Gareris Sanatana*, Moore, Trans. Ent. Soc. Lond. 1880, p. 156.*Mycalesis (Gareris) Sanatana*, Marshall and de Nicéville, Butt. of India, etc. i. p. 108 (1883).

IMAGO.—Male and female. Upperside olivaceous-brown, paler externally from beyond the transverse discal line which is slightly seen through from the underside; extreme outer margin slightly ochreous and with a dusky anteciliary line. *Forewing* with a large black ocellus between the middle and lower median veins, to which is some-

times attached an upper minute ocellule; a much smaller subapical ocellus between the radials, and in some specimens a very small contiguous ocellus is also present above the latter, whilst in others there is also a much smaller ocellule beneath it, both of which, or sometimes one of them only, is represented by a white dot. Underside paler; of an olivescient ochreous-brown colour, and palest on the outer border; crossed by a common discal line which is outwardly-bordered with pale violet, which is slightly excurved, generally even, but sometimes slightly wavy, and bent inward above the anal angle; two very indistinct, but always present, wavy brown lines, cross the cell of the forewing, and a similar continuous wavy line extends across the hindwing to the abdominal margin. *Forewing* with three anterior and one posterior submarginal white dots, and on the *hindwing* seven similar white dots; both series of which in some specimens are more or less represented by minute ocelli; both wings with a submarginal sinuous slender brown line and a wavy marginal line. Cilia cinereous. *Male* with a tuft of black hairs overlapping a glandular patch of scales on each side of the middle of the submedian vein of the forewing, and on the hindwing with a glandular tuft of yellow hairs exerted over the swollen base of the first subcostal branch. *Body* brown above, ochreous-brown beneath; legs, and sides of palpi, pale ochreous-brown.

Expanse, ♂ 2, ♀ $2\frac{1}{4}$ inches.

HABITAT.—N.-W. and E. Himalayas; Khasia Hills; Upper and Lower Burma.

Of the illustrations on our Plate No. 56, figs. 1, 1a, b, represent the male and female of the wet-season form, and figs. 2, 2a, b, the male and female of the dry-season form.

DISTRIBUTION.—In the N.-W. Himalayas, Mr. Graham Young obtained the dry-season form in the Kulu Valley at the end of May and in June (Butt. Ind. i. 108). Specimens from Raniket in Kumaon, taken at 6000 feet in April, are in the British Museum. Mr. W. Doherty (J. A. S. Beng. 1886, 114) records it from Western Kumaon, obtaining the dry-season form at Askot, 5000 feet, in October, and the wet-season form at Ramgarh and Takula, 5000—6000 feet. Major-General G. Ramsay obtained it in the Nepal Valley. In Sikkim it has been taken by Mr. L. de Nicéville in October, at about 3000 feet (J. A. S. Beng. 1882, 55). According to Mr. H. J. Elwes (Tr. Ent. Soc. Lond. 1888, 305) "both forms occur not uncommonly in the valleys of Sikkim up to about 3000 feet, the wet-season form (Gopa) prevailing from June to October, and the dry season form (Sanatana) during March, April and May." It has also been taken at Shillong, Khasia Hills. In Burma, the dry-season form has been obtained in the Karen Hills in February. Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 517) records it from Bernardmyo in the Shan States. Captain Bingham (Butt. Ind. i. 108) also "obtained it on the Donat range, Upper Tenasserim, in January."

Genus SADARGA.

Sadarga, Moore, Trans. Ent. Soc. Lond. 1880, p. 157.

Mycalesis (Sadarga), Marshall and de Nicéville, Butt. of India, etc. i. p. 109 (1883).

IMAGO.—*Forewing* shorter, with more rounded and less oblique exterior margin than in *Virapa*; venation similar, but the veins more curved. Male above with a slight appressed tuft of hairs (but no perceptible glandular patch of raised scales) overlapping the middle of the submedian vein near the swollen base. *Hindwing* very convex externally; first subcostal in male not curved at the base; second subcostal concave at the base and much swollen on the underside between the first and end of the cell, and with a slight glandular tuft of radiating hairs on the upperside below the first subcostal; upper and middle median branches emitted from angle before end of the cell. *Eyes* hairy.

Type.—S. Gotama.*

SADARGA CHARAKA.

WET-SEASON BROOD (Plate 57, figs. 1, 1a, b, c, ♂ ♀).

Sadarga oculata, Moore, Trans. Ent. Soc. Lond. 1880, p. 158.

Mycalesis (Sadarga) oculata, Marshall and de Nicéville, Butt. of India, etc. i. p. 109 (1883).

IMAGO.—Male and female. Upperside olivaceous-ochreous-brown; transverse discal line indistinct; marginal lunular line dark, with pale borders. *Forewing* with a moderately-sized prominent subapical ocellus, and a very large median ocellus, the latter somewhat bulged anteriorly and posteriorly, each with white pupil and ochreous-yellow ring. Male with a slight appressed tuft of brown hairs overlapping a small glandular patch of scales on the middle of the submedian vein. *Hindwing* with the median ocellus of the underside slightly visible, a slight glandular tuft of ochreous hairs from below base of first subcostal overlapping the swollen base of the second subcostal. Underside pale purplish-ochreous, palest externally; subbasal line slender; the transverse discal line distinct and with a broad well-defined pale yellow exterior border; a submarginal slender blackish sinuous line, and an even marginal line. *Forewing* with three, conjoined, subapical, prominent ocelli, of which the upper and lower are minute; a large lower ocellus also between the medians. Male with a small glandular patch of dark-brown scales on middle of the submedian vein. *Hindwing* with seven prominent ocelli, the upper three of which are disposed in a very oblique outward series, and decrease in size to the fourth, which is very minute, the fifth largest, the lower two small.

Expanse, ♂ $1\frac{8}{10}$, ♀ $2\frac{1}{10}$ inches.

* A Chinese species.

DRY-SEASON BROOD (Plate 57, fig. 2, 2a, ♂).

Mycalasis Charaka, Moore, Proc. Zool. Soc. 1874, p. 566.

Sadarga Charaka, Moore, Trans. Ent. Soc. Lond. 1880, p. 158.

Mycal (*Sadarga*) *Charaka*, Marshall and de Nicéville, Butt. of India, etc. i. p. 109 (1883).

Calysisme Peribœa, Butler, Ann. & Mag. Nat. Hist. 1885, p. 301, ♀ (*nec* Fabr.).

IMAGO.—Male and female. Upperside olivaceous-ochreous-brown, outer borders palest, with a dark submarginal and marginal lunular line. *Forewing* with two very prominent bright-coloured ocelli, the upper or subapical the smallest (and sometimes bi-pupilled, consequent upon the fusion beneath of a minute ocellule), the second or lower very large, fully a quarter of an inch in diameter, each with a distinct white pupil and ochreous-yellow outer ring. *Male* above with a slight appressed tuft of brown hairs overlapping the small glandular patch of scales on the middle of the submedian vein. *Hindwing* with a small indistinct ocellus between middle and lower median veins; a slight glandular tuft of ochreous hairs radiating from below base of first subcostal over the swollen base of the second subcostal. Underside paler ochreous-brown basally, cinereous-ochreous externally, divided by a nearly straight transverse discal darker brown line; two shorter brown subbasal zigzag lines on forewing, and one on the hindwing; both wings with a slender blackish submarginal sinuous line and a less defined marginal line, and a brown transverse shade passing through the ocelli. *Forewing* with a linear series of three, sometimes four, subapical minute ocelli, and a small though larger lower ocellus between the medians, the white pupil of the latter being large, hemispherical, and occupying nearly the whole black area. *Male* beneath with a small glandular patch of dark-brown scales near middle of the submedian vein. *Hindwing* with seven very small ocelli, the three upper disposed in an outwardly oblique linear series, the fourth minute, fifth the largest (though small), the sixth and seventh also minute.

Expanse, ♂ 1 $\frac{3}{8}$, ♀ 2 inches.

HABITAT.—Silhet; Cachar; Naga Hills; Upper Burma.

This species is very similar in appearance to the Chinese species, *S. Gotama*, but may be distinguished from the latter by the greater size of the ocelli on the upperside of the forewings and the smaller size of those on the underside of both wings.

Of the illustrations of this species on our Plate No. 57, figs. 1, 1a, b, c, are of the male and female wet-season brood, and figs. 2, 2a, that of a male of the dry-season form.

DISTRIBUTION.—This species is recorded from Silhet. It occurs in Cachar, and the Naga Hills. Dr. G. Watt (Ann. Nat. Hist. 1885, 301) obtained a single female of the dry-season brood on the border of Assam. According to Major C. H. E. Adamson (List of Burmese Butterflies, 1889, p. 7) the dry-season form "was very abundant at one spot in the Bhamo district in November."

Genus ORSOTRIÆNA.

Orsotriæna, Wallengren, Kongl. Vet. Akad. Förh. xv. p. 79 (1858). Moore, Lep. of Ceylon, i. p. 22 (1880); Trans. Ent. Soc. Lond. 1880, p. 159. Semper, Reisen Archipel. Philippen. Lep. p. 44 (1886).

Mycalesis (*Orsotriæna*), Marshall and de Nicéville, Butt. of India, etc. i. p. 111 (1883).

Mycalesis (*sect. 1a*), Distant, Rhopal. Malayana, p. 49 (1882).

IMAGO.—*Forewing* comparatively short, exterior margin slightly oblique, the apex and posterior angle convex; costal vein only, in both sexes, swollen at the base. *Hindwing* somewhat arched at the base, anal angle convex; first subcostal branch emitted immediately before end of the cell; discocellular long, slightly oblique; middle median also emitted before lower end of the cell. *Male* on the upperside of the *forewing*, with a tuft of fine long hairs, arising from within the base of and overlapping or enclosed within a narrow glandular pouch or fold situated above the submedian vein; and on the upperside of the hindwing, with a tuft of delicate recumbent hairs situated above and below the base of the median vein. *Eyes* naked. *Antennæ* slender, short, with imperceptibly thickening club.

ADULT CATERPILLAR.—“Spindle-shaped, transversely rugose and clothed with minute bristles; head with two long setose spines pointed forward, and two caudal spines.”

CHRYsalis.—“Perpendicularly suspended, slender, and regular, except that the head-case is produced into a long beak formed of two thin processes like split-straws.” (Davidson and Aitken.)

Type.—O. Medus.

ORSOTRIÆNA MEDUS.

WET-SEASON BROOD (Plate 58, fig. 1, 1a, b, ♂ ♀).

Papilio Medus, Fabricius, Syst. Ent. p. 488 (1775).

Orsotriæna Medus, Moore, Trans. Ent. Soc. Lond. 1880, p. 160. Semper, Reisen Archipel. Philippen. Lep. p. 44 (1886).

Mycalesis Medus, Distant, Rhopal. Malayana, p. 49, pl. 4, fig. 8, ♂ (1882). Elwes, Trans. Ent. Soc. 1888, p. 303.

Mycalesis (*Orsotriæna*) *Medus*, Marshall and de Nicéville, Butt. of India, etc. i. p. 111 (1883).

Papilio Hesione, Cramer, Pap. Exot. i. pl. 11, fig. C. D. (1775).

Mycalesis Hesione, Hübner, Verz. bek. Schmett. p. 55 (1816). Hewitson, Journ. Linn. Soc. Lond. Zool. viii. p. 146. Butler, Catal. Satyr. Brit. Mus. p. 138 (1868); *id.* Catal. Fabrician Lep. B. M. p. 34 (1869).

Orsotriæna Hesione, Wallengren, Kongl. Vet. Akad. Förh. xv. p. 80 (1858).

Papilio Doris, Cramer, Pap. Exot. iv. pl. 362, fig. C. (1782).

Papilio Hamilcar, Herbst, Natur. Schmett. viii. p. 73, pl. 193, fig. 3 (1796).

Mycalesis cinerea, Butler, Annals & Mag. Nat. Hist. 1867, p. 401, pl. 8, fig. 9.

IMAGO.—Male and female. Upperside uniform dark umber-brown, without markings except two slender wavy whitish-cinereous marginal lines and the trans-

verse discal band of the underside being slightly apparent. Underside generally paler, sometimes of a cinerous tint; with a prominent transverse discal narrow white band, which does not reach either the costa of forewing or the abdominal margin of the hindwing, and a slender whitish submarginal and marginal wavy line. *Forewing* with a subapical and a larger lower median black ocellus with white pupil and ochreous ring, each also being again encircled by a narrow silvery-grey outer ring. *Hindwing* with two contiguous upper-apical similar ocelli, of which the anterior is the smallest, and a larger lower median ocellus, each also being again encircled by a metallic silvery-grey outer ring; this latter ring, in some specimens, encompassing both of the upper ocelli instead of there being a separate ring to each of them. *Body* beneath and legs, paler; sides of palpi whitish.

Male, on the upperside of the *forewing*, with a tuft of fine long dusky hairs arising from within the circular base of and overlapping, or enclosed within, a narrow elongated glandular pouch or fold situated above the submedian vein; and on the upperside of the *hindwing*, with a tuft of delicate recumbent hairs situated above and below the base of the median vein.

Expanse ♂ $1\frac{3}{8}$ to 2, ♀ $1\frac{5}{8}$ to $2\frac{3}{8}$ inches.

DRY-SEASON BROOD (Plate 58, fig. 2, ♀).

Mycalesis Runeka, Moore, Catal. Lep. Mus. East India Compy. i. p. 234 (1857).

Orsotriena Runeka, Moore, Trans. Ent. Soc. Lond. 1880, p. 160.

Mycalesis (Orsotriena) Runeka, Marshall & de Nicéville, Butt. of India, etc. i. p. 112, pl. 16, fig. 56, ♂ (1883).

IMAGO.—Male and female. Upperside uniform dark umber-brown; with pale marginal lines, and slightly apparent transverse discal narrow band, as in wet-season brood. Underside generally deeper coloured, and of a more ferruginous tint; the transverse discal narrow band more or less ochreous-white; in some specimens the band is defined only by a dark brown line with no visible white border; the ocelli of both wings are small, rudimentary, pale brown with ochreous-white pupil; sometimes those of the hindwing are more developed; in others the ocelli are obsolescent, being defined only as darker brown spots with minute white pupil; the outer margin, especially of the hindwing, generally thickly irrorated with ochreous-grey scales. *Male* with the tuft of hair and glandular pouch on the forewing, and the tufts on the hindwing, as in the wet-season brood.

Expanse $1\frac{7}{8}$ to $2\frac{3}{8}$ inches.

HABITAT.—N.-western, Central and Eastern India; Sikkim; Assam; Cachar; Naga Hills; Burma; Nicobars; Malayana.

DISTRIBUTION.—This species has a very wide range beyond our limits. Within our area, its extreme western range recorded is Umballa, where the wet-season

form was obtained by Colonel A. M. Lang, and also in Oudh (Ent. Mag. 1864, 182). Mr. L. de Nicéville also took it in the Deyra Dhoon (Butt. Ind. i. 113), and Mr. J. A. Betham (J. Bomb. N. H. S. 1890, 156) obtained it in the Central Provinces, remarking that "these little butterflies are shade lovers, and lie hidden under the trees and bushes during the day time; they are active and restless in the morning and evening, and also when the day happens to be dark and cloudy. They have a skipping kind of flight when started from the shades they love; they are, however, easily caught and killed." In Orissa, Mr. Taylor records its capture at Khurda, "the dry-season brood being very common in November." Mr. L. de Nicéville (J. A. S. Beng. 1885, 41) says, "the ocellated form occurs somewhat sparsely during the rains in the Calcutta district, the unocellated form being met with only in the cold and dry weather." Mr. Wood-Mason (J. A. S. Beng. 1887, 348) records "numerous specimens of both sexes of the ocellated form, taken in Cachar during the rainy season between May 26th and August 9th, and four males only of the unocellated form were taken at the end of the dry season between the 3rd and 5th of May." The dry-season form has been taken in the Khasia Hills (Butt. Ind. i. 113), and examples of both the wet and dry-season forms from the Naga Hills are in Mr. P. Crowley's collection. In Sikkim, according to Mr. H. J. Elwes (Tr. Ent. Soc. Lond. 1888, 303), "this species is not common, but occurs in the Terai and up to 3000 feet; *medus*, the rainy-season form, occurs from May to September, and *runeka* from October to March, though there may be occasional instances of either forms being taken out of season. *Runeka* seems more abundant than *medus*, which is rather an insect of the plains than the hills." Mr. O. Möller took the rainy-season form in the Sikkim Terai in August and September, and Mr. de Nicéville the dry-season form in October (Butt. Ind. i. 112). In Upper Burma, the unocellated form was taken by Commander A. Carpenter in December, on the Irrawaddy, thirty miles above Mandalay (Ann. Nat. Hist. 1886, 183). Dr. N. Manders (Tr. Ent. Soc. 1890, 517) says it is "not a common insect in the Shan States, but common enough in Upper Burma." Major C. H. E. Adamson (List of Burmese butterflies) says it is "very common throughout Burma, *medus* during the rainy season, and *runeka* from October to March." Mr. O. Limborg (P. Z. S. 1878, 825) obtained the dry-season form during the cold weather in Upper Tenasserim, at Ahsohn, from Moulmein to Meetan, at Hatseiga, and from Naththoung to Paboga." Mr. Oates obtained the wet-season form in Pegu in May. Captain C. T. Bingham has taken the dry-season form in the Donat range, and at Mepley and various parts of the Thoungyeen valley. Mr. C. T. Hill took it at Tavoy in March (Butt. Ind. i. 112). Mr. H. J. Elwes (J. A. S. Beng. 1887, 418) also records it from Tavoy. Dr. J. Anderson (Journ. Linn. Soc. 1886, 32) obtained specimens in the Mergui Archipelago in December and March. In the Nicobar Islands, the wet-season form is

recorded (P. Z. S. 1877, 583) from Kamorta, where it was taken by Mr. Raphael Meldola in April. It occurs also on Katschall, Great Nicobar, is numerous on Little Nicobar, and Nankouri, from August to November. It has not been recorded from the Andamans.

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant (Rhop. Malayana, 50) records it from the Malay Peninsula, Penang, and Singapore. It also occurs in Sumatra, Nias, Java, Flores, Timor, Macassar, Borneo, Philippines, and Consul R. Swinhoe (P. Z. S. 1878, 696) obtained the dry-season form in Hainan.

ORSOTRIENA MANDATA.

WET-SEASON BROOD (Plate 58, fig. 3, larva and pupa; fig. 3a, b, c, ♂ ♀).

Mycalesis Mandata, Moore, Catal. Lep. Mus. East India Compy. i. p. 233 (1857). Butler, Catal. Satyr. Brit. Mus. p. 139 (1868). Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1890, p. 267, pl. A, fig. 1, 1a, larva.

Orsotriena Mandata, Moore, Trans. Ent. Soc. Lond. 1880, p. 160; *id.* Lep. of Ceylon, i. p. 22, pl. 11, fig. 1, 1a (1880).

Mycalesis (Orsotriena) Mandata, Marshall and de Nicéville, Butt. of India, etc. i. p. 113 (1883). Hampson, Journ. Asiat. Soc. Bengal, 1888, p. 348.

Mycalesis Gamaliba, Butler, Ann. Mag. Nat. Hist. 1867, pl. 2, fig. 3, 3a, b.

IMAGO.—Male and female. Upperside uniform dark umber-brown; marginal whitish lines distinct; the broad transverse discal band of the underside slightly apparent. Underside generally darker coloured; marginal whitish lines prominent; discal transverse band prominent, white, broad, tapering anteriorly on the forewing; the ocelli very prominent, similar to those in *O. medus*, and with an encircling outer silvery-grey ring; a few ochreous-grey scales irrorating the outer margins. *Male* with the dusky-brown tuft on both wings as described in *O. medus*. *Body* dark brown; sides of palpi ochreous-white.

Expanse $1\frac{1}{2}$ to 2 inches.

DRY-SEASON BROOD (Plate 58, fig. 4, ♀).

Mycalesis Mandosa, Butler, Catal. Satyridæ, Brit. Mus. p. 139, pl. 3, fig. 9 (1868).

Orsotriena Mandosa, Moore, Trans. Ent. Soc. Lond. 1880, p. 160.

Mycalesis (Orsotriena) Mandosa, Marshall and de Nicéville, Butt. of India, etc. i. p. 113 (1883).

IMAGO.—Male and female. Upperside uniform dark brown, as in the wet-season brood. Underside with similar broad transverse discal band, which is more or less ochreous-white. Both wings with smaller ocelli, which are obsolescent on the forewing, much less defined on the hindwing, and very slightly ringed outwardly with silvery-grey. Outer margins slightly irrorated with ochreous-grey scales. *Male* with the tufts on both wings as in the wet-season brood.

Expanse $1\frac{2}{3}$ to $2\frac{1}{3}$ inches.

ADULT CATERPILLAR.—“Spindle-shaped; transversely rugose and rough, owing

to the skin being clothed with minute bristles; there are two long setose spines on the head, pointed forwards, and two caudal spines. The colour above is rosy-red, with a blue dorsal line and a white lateral line, below which the under parts are green."

CHRYsalis.—"Perpendicularly suspended; slender, and regular, except that the head-case is produced into a long beak formed of two thin processes like split straws. Colour whitish-brown, with faint striæ of a darker shade. It has very much the look of a large grain of barley" (Davidson and Aitken, *l. c.*).

HABITAT.—South India; Ceylon.

DISTRIBUTION.—Messrs. Davidson and Aitken (Journ. Bombay, Nat. Hist. Soc. 1890, 267) records it from Karwar, in Bombay, obtaining the larva, feeding on grass in September, the description of which we have here transcribed, and also reproduced their figure of the larva and pupa on our Plate 58. Mr. G. F. Hampson (J. A. S. Beng. 1888, 348) obtained it on the Nilgiris, at "3000 feet, being common in the jungles at the northern base of the hills, and throughout the Wynâd and Mysore forests. The wet-season form is found from June to September, when its place is taken by the dry-season brood." There are examples of the wet-season brood in the British Museum from the Bhowani Valley, Malabar, and of the dry-season brood from Bandipore, Mysore, 3000 feet, taken in November. In Ceylon, Captain Hutchison (Lep. Ceylon, i. 23) says, of the wet-season form, it "frequents open ground at edges of forests; found in the plains and up to about 3000 feet, in the western and central provinces from May to September; flight slow and for short distances; settling down among long grass and is easily captured." Mr. E. E. Green obtained numerous examples of the wet-season form at Punduloya in the Western Central division of Ceylon, in August and September.

Genus CALYSISME.

Calysisme, Moore, Lep. of Ceylon, i. p. 20 (1880); Trans. Ent. Soc. Lond. 1880, p. 161.

Mycalesis (part), Hübner, Verz. bek. Schmett. p. 55 (1816). Doubleday and Westwood, Gen. Diurn.

Lep. p. 392 (1851). Herr Schæffer, Prod. Lep. i. p. 62 (1865). Butler, Catal. Satyridæ, Brit.

Mus. p. 128. Kirby, Syn. Catal. Diurnal Lep. p. 87 (1871).

Mycalesis (sect. B), Distant, Rhopalocera Malayana, p. 50 (1882).

Mycalesis (*Calysisme*), Marshall and de Nicéville, Butt. of India, etc. i. p. 114 (1883).

IMAGO.—Wings short, broad. *Forewing* with the costa arched from the base, apex more or less acute in male, less so in the female, exterior margin very slightly oblique and curved, posterior angle more or less acute; costal, median, and submedian vein swollen at the base; second subcostal branch emitted immediately before end of the cell; the cell broad; discocellulars very concave, the radials from two angles in the upper near the subcostal. *Hindwing* bluntly oval; costa arched at the base; exterior margin convex, more or less dentate; first subcostal branch

emitted before end of the cell; discocellulars long, slightly concave, radial from their middle; two upper median branches from end of the cell.

Male with a tuft of long hairs on upperside of the *hindwing*, radiating from below the base of the subcostal vein, and overlapping a glandular patch of scales situated below the first subcostal branch, this branch being also slightly swollen beneath, all encompassed by the broad costal nacreous area. On the underside of the *forewing*, surrounded by the posterior nacreous area, is a glandular patch of scales situated upon the middle of the submedian vein.

Body slender; palpi porrect, slender, flattened, finely pilose beneath; legs slender.

Eyes hairy. *Antennæ* slender at the tip.

EGGS.—“White, shining, semitransparent.”

CATERPILLAR AT BIRTH.—“Pale green. Head black, bearing two very obtuse black horns on the crown; caudal processes very small.”

ADULT CATERPILLAR.—“Fusiform, the whole body very rough or rugose, thickly set with minute tubercles. Head armed with two divergent, blunt conical horns; head and horns thickly set with small rough tubercles, and face covered with short hairs. Anal segment furnished with two short slightly-divergent pointed processes.”

CHRYsalis.—Suspended by the tail. “Smooth, thorax very convex and constricted at base of the abdomen” (*de Nicéville*).

Type.—*C. Drusia* (Mineus).

SEASONAL FORMS AND SIMILARITY OF THE SPECIES.—The species of *Calysisme*, as has been proved by the breeding of *C. visala* and *C. perseus* by Mr. L. de Nicéville, have two forms of individuals in the annual broods that occur in each species, a *wet-season* form, and a *dry-season* form. Both these forms had previously been separately named and described, and considered hitherto to be distinct species, one from the other. The two forms, as hereinafter described, much resemble each other on the upperside of the wings, but on the underside the two forms are very dissimilar, the wet-season form being marked with a transverse pale band, and prominent ocelli upon the outer border; these characteristic markings being, in the dry-season form, only represented by a more or less defined darker line bordering the basal area, and the ocelli are undeveloped, or represented only as small black spots with a white central dot, and these spots being generally more or less obsolescent.

The wet-season forms of the various species, however, are much alike, both above and below, and the dry-season forms of the various species have a similar resemblance, one to that of the other; consequently, this similarity of both the upper and underside makes it extremely difficult to discriminate one species from another, and it is mainly by the aid of the position, size, and colour of the glandular

patches in the males (hereinafter described) that the species can be correctly separated.

CHARACTERISTICS OF THE MALE.—In the males of certain species of *Calysisme* there is a difference in the position and size of the glandular patches of scales, which normally occur on the underside of the forewing, and also on the upperside of the hindwing (where they are overlapped by a tuft of hair), in all the species of the genus, this difference being also accompanied by that of the colour of their clothing scales, and by the shape of the scales themselves. *Firstly*, we find, as in the species which we have determined to be the true *mineus* of Linnæus, that the glandular patch on both wings is small, and the patch on the underside of the forewing situated upon the *middle* of the submedian vein, both, however, being clothed with *blackish scales*; these scales, as seen under the microscope, are densely packed, but loosely raised and overlapping, are large, broad, oval, and with even front-edge. *Secondly*, in the species named *visala*, and which hitherto had been erroneously identified by modern entomologists as representing the Linnæan *mineus* (as detailed further on), the glandular patches are elongated, the patch itself on the underside of the forewing being two-thirds larger than that in the true *mineus*, and *extends from the middle of the vein to the transverse discal band*, both patches, moreover, being clothed with *pale yellow scales*, which are large, rather long, and broadest anteriorly, with even rounded front-edge. *Thirdly*, another difference occurs in the species which we have named *intermedia*, where the patch on the underside of the forewing is of an intermediate size and length, being nearly twice the size of that in *mineus*, occupying a similar middle position on the submedian vein, and in which the clothing scales are *dark brown*, somewhat longer, narrower, and anteriorly more curved. And *fourthly*, we find a difference in the shape and size of the ordinary patch on the upperside of the hindwing, as occurs in the species we have named *Horsfieldii* and *Distanti* (and described among the Indo-Malayan allied species), wherein the sub-basal tuft of hairs only partially overlaps a very prominent and abnormally elongated patch of *bright yellow scales*, the patch itself extending from above the base of the first subcostal and then bending through the interspace between its two branches to nearly half-way towards the outer margin of the wing, its end thus being conspicuous beyond the hairy tuft.

CALYSISME PERSEUS.*

WET-SEASON BROOD (Plate 59, fig. 1, 1a, b, ♂ 1c, d, ♀).

Papilio Blasius, Fabricius, Ent. Syst. Suppl. v. p. 426, No. 488-9 (1798).

Mycalesis Blasius, Butler, Proc. Zool. Soc. 1867, p. 720, fig. 4, ♂; Catal. Fabr. Lep. Brit. Mus. p. 34 (1869); Catal. Satyr. Brit. Mus. p. 137 (1868). Distant, Rhop. Malayana, p. 52, pl. vii. fig. 7 ♂

* *Perseus* being the oldest name given to this species, it consequently takes precedence of *Blasius*.

- (1882). Semper, Reisen Archip. Philippen, Lep. i. p. 50, pl. 10, fig. 9, 10, ♂ ♀ (1886). Elwes, Trans. Ent. Soc. Lond. 1888, p. 303.
- Calysisme Blasius*, Moore, Lep. of Ceylon, i. p. 21, pl. xi. fig. 2, 2a (1880); Trans. Ent. Soc. Lond. 1880, p. 162; P. Z. S. 1882, p. 237.
- Mycalesis (Calysisme) Blasius*, Marshall and de Nicéville, Butt. of India, etc. i. p. 115, pl. xvi. fig. 55, ♂ (1883).
- Mycalesis Perseus* et *Blasius*, de Nicéville, Journ. Asiat. Soc. Bengal, 1886, p. 235; *id.* 1887 p. 418. Moore, P. Z. S. 1878, p. 825.
- Mycalesis Perseus* (form *Blasius*), Hampson, Journ. Asiat. Soc. Beng. 1888, p. 248.
- Mycalesis Samba*, Moore, Catal. Lep. Mus. E. I. C. i. p. 233 (1857), ♂.
- Mycalesis Cepheus*, Butler, Ann. Nat. Hist. 1867, p. 402, pl. 9, fig. 3, 4, ♀.
- Mycalesis lurida*, Butler, Trans. Ent. Soc. Lond. 1879, p. 3, ♂.

IMAGO.—Male. Upperside dark olivaceous-brown; marginal lines pale-brown; cilia cinereous-brown. *Forewing* with the transverse discal band of the underside sometimes slightly visible, and with a lower median very small white-pupilled black spot. *Hindwing* with a tuft of yellowish radiating hairs arising within the cell from below the base of subcostal vein and overlapping a *glandular patch of black scales* at its first branch.

Underside dark vinaceous ochreous-brown; with a very narrow purplish-white transverse discal band, and two marginal ochreous lunular lines. *Forewing* with four submarginal distinct ocelli, the two middle of which are always very minute and placed externally between the upper and lower, the whole four being encompassed by a narrow constricted purplish-white ring; in some few specimens the upper and lower ocelli only are present, each then being encircled by a separate purplish-white ring (as in the variety named *Samba* [fig. 1, b, plate 59]; others, again, have only one of the middle minute ocelli developed between the upper and lower, and all encompassed by the outer purplish-white constricted ring (as in the variety described by Fabricius, as *Blasius*, and by Mr. Butler, as *Cepheus*); occasionally, also, a male specimen has a fifth or lower minute ocellus attached below the large median ocellus, and encompassed by the outer ring; others, again, sometimes occur, in which the two upper ocelli are separately encircled by the purplish-white outer ring, the two lower being similarly encircled. In all these varieties the *glandular patch of scales* on the middle of the submedian vein is small and black. *Hindwing* with a recurved submarginal series of seven distinct ocelli, of which the second, third, and seventh are very small, and all encompassed by a purplish-white lunular line.

Female. Upperside. Both wings with the transverse discal narrow band of the underside slightly visible; the marginal lines more distinct. *Forewing* with the very small white-pupilled black spot between the medians always present. Underside paler than in the male; the transverse narrow discal band and marginal lines more prominent. *Forewing* with the four submarginal ocelli, the two middle of which are

minute, and all encompassed by the pale outer constricted line, as in the male ; very rarely a specimen of the female occurs in which the three ocelli only are present, and more rarely still with the upper and lower only. *Hindwing* with the seven ocelli as in the male. *Body* dark brown, sides of the palpi cinereous.

Expanse $1\frac{4}{8}$ to $1\frac{7}{8}$ inch.

DRY-SEASON BROOD (Plate 59, fig. 2, 2a, ♂ 2b, c, d, e, ♀).

Papilio Perseus, Fabricius, Syst. Ent. p. 488 (1775), ♀. Donovan, Ins. of New Holl. pl. 26, fig. 3 (1805).

Mycalesis Perseus, Butler, Proc. Zool. Soc. 1867, p. 719, fig. 2; Catal. Satyr. Brit. Mus. p. 133 (1868); Catal. Fabr. Lep. Brit. Mus. p. 33 (1869).

Calysisme Perseus, Moore, Trans. Ent. Soc. Lond. 1880, p. 163; P. Z. S. 1882, p. 237; Journ. Linn. Soc. Lond. Zool. 1886. p. 32.

Mycalesis (Calysisme) Perseus (part), Marshall and de Nicéville, Butt. of India, etc. i. p. 120, (1883). Doherty, Journ. Asiat. Soc. Bengal, 1886, p. 114.

Papilio Tabitha, Fabricius, Ent. Syst. III. i. p. 243 (1793).

Satyrus Zopyrus, Kollar, Hügel's Reise Kaschmir, iv. pt. 2, p. 450 (1844), ♂.

IMAGO.—Male. Upperside dark olivaceous ochreous-brown; the outer margins, and cilia cinereous-brown. *Forewing* with the transverse discal band blackish, but indistinct; a small black median ocellus with white pupil but no outer yellowish ring. *Hindwing* with one, sometimes two, minute blackish subanal spots, the upper of which is between the middle and lower medians and is sometimes white pupilled; a sub-basal radiating tuft of yellow hairs overlapping a small *glandular patch of black scales*. Underside various shades of virescent greyish-brown, speckled with darker brown, the basal area darkest, the transverse sub-basal and discal line more or less indistinctly defined, the latter sometimes slightly pale bordered externally, the discal line on both wings also having a small black inner point and a pale yellow outer point on each vein; a more or less indicated submarginal series of slender points or denticules. *Forewing* with four minute more or less distinctly defined submarginal white-pupilled blackish spots; and a small *glandular patch of black scales* on middle of the submedian nacreous area. *Hindwing* with seven very small black spots with white pupil, or sometimes with more or less developed small ocelli, of which the upper one and the three lower are generally the most distinct or more developed.

Female. Larger than the male. Upperside. *Forewing* generally with the transverse discal line more defined, the median ocellus somewhat larger, and sometimes a minute subapical ocellus is present. *Hindwing* as in male. Underside of similar colour, and brown speckled, as in male; the transverse discal line with points on each vein; the minute ocelli or dots the same.

Expanse ♂ $1\frac{6}{8}$ to $1\frac{7}{8}$, ♀ $1\frac{7}{8}$ to $2\frac{1}{8}$ inches.

HABITAT.—Northern, Eastern, Central and Southern India; Ceylon; Burma; Malayana.

WET AND DRY-SEASON FORMS.—Of the two named forms, *blasius* and *perseus*, Mr. de Nicéville (J. A. Soc. Bengal, 1887, 348) states that he has proved by actual breeding, that they are but seasonal forms of one and the same species. No full account of the transformations, however, or the rearing of the broods, has yet been published.

VARIATION OF INDIVIDUALS IN DRY-SEASON BROOD.—The dry-season brood of this species is generally more or less larger in size than those of the wet-season brood, especially in the female. In some specimens of the dry-season brood reared in Calcutta by Mr. L. de Nicéville at the end of November, 1886, from eggs deposited by a female of the previous wet-season brood, and kindly sent me for examination, both sexes (Plate 59, f, d, ♀) are more like those of the wet-season brood on the underside, not only in the general tone of colour, but in having, though of smaller size, fully developed ocelli on both wings; the discal band distinctly formed and with very slightly-defined vein points, the outer border of the wings virescent-grey and somewhat speckled, and the submarginal lines also well defined. Other specimens of this same brood—and emergence on the same day—being of the normal mottled pattern on the underside. In another example of the female (Plate 59, f, e, ♀) which was sent to me years ago from Calcutta by the late Mr. W. S. Atkinson, the upper and lower ocellus on the underside of the forewing is replaced by a large white spot, and the ocelli on the hindwing have each a large speckled-white pupil.

Of the illustrations of this species on our Plate No. 59, figs. 1, 1a, is that of a Calcutta male of the wet-season brood; fig 1b, that of a Calcutta male of the variety named *Samba*; and figs. 1c, d, of a Ceylon female of the same brood. Of the dry-season brood, figs. 2, 2a, represents a Calcutta male; figs. 2b, c, a Nilgiri female, and figs. 2d and 2e, varieties of Calcutta females.

DISTRIBUTION WITHIN INDIAN AREA.—This is a very widely distributed species, being found in all suitable localities throughout India, except in the extreme west. It also extends to Ceylon and Burma, but has not been found in the Andaman or Nicobar Islands, though it has been erroneously included in the list of the Andaman butterflies published in Proc. Zool. Soc. Lond. 1877, 583, on the authority of its previous insertion, by Mr. Hewitson, in the list compiled by him and published in the Annals & Mag. Nat. Hist. 1874, p. 356, under the name of *M. Samba*. In the N.W. Himalayas, Major H. B. Hellard, in his MS. Notes, records its capture in Simla, at the end of June; the Rev. J. Hocking (P. Z. S. 1882, 237), obtained it in Kangra; Mr. W. Doherty (J. A. S. Beng. 1886, 114) took it in Kumaon, “the first specimen of the dry-season form seen on the Lower Gori, 2500 feet, Sept. 29th; also in the Kali Valley and the Bhábar or dry Tarai, 1—3000 feet; the wet-season form being common in the same localities in August and September.” In the Eastern Himalayas, according to Mr. de Nicéville (J. A. S. Beng. 1885, p. 1), “both the ocellated and

unocellated forms are very rare in Sikkim," and Mr. H. I. Elwes (Tr. Ent. Soc. Lond. 1888, 303), also observes that they "are not common in the Sikkim hills, but occur at low elevations, and more abundantly in the Terai. Mr. O. Müller notes both forms as occurring towards the end of the rains in September and October." It is recorded (Butt. of India, i. 116) from the Punjab, and also as being common at Lucknow in Oudh. In Manipuri, N. W. Provinces, it was obtained by the late Mr. C. Horne. At Mhow, in the Central Provinces, Col. C. Swinhoe (P. Z. S. 1886, 422), records the capture of *perseus* in October and April, one specimen only being taken in the latter month; it was fairly common in October." Mr. J. A. Betham obtained it at Raipur in November. In Bombay, *perseus* was taken by Col. Swinhoe in "October, but was not common, and in Poona in October and November." Major W. J. Yerbury, in his MS. Notes, records *perseus* as taken "on Matheran Hill at end of October." Mr. G. F. Hampson (J. A. S. Beng. 1888, 348) obtained it on the Nilgiris—the specimens recorded are now under examination,—the wet-season brood being taken in August, September and October and the dry-season brood in November and January. From Travancore, further south, I possess specimens taken at Kowdias, at 2000 feet. In Ceylon, Capt. Hutchinson states (Lep. Ceylon, i. 21) that it is "found at all times in the Western and Central Provinces, both in the plains and up to 2000 feet, on grassy lands; its flight being short and slow, along edges of forest-paths and grass lands, settling on tufts of grass." On the Eastern side of Continental India we have no record of its occurring in the Madras district. Mr. W. C. Taylor notes it in his list of butterflies of Orissa, as being taken in Khorda, where it is very common. Specimens from Ranchi, Lower Bengal, taken by Mr. Irvine, in July, are in Col. Swinhoe's collection. In the neighbourhood of Calcutta Mr. J. Rothney (Ent. Mo. Mag. 1882, 34) found it "common in Barrackpore Park, being fond of shade and settling mostly on long grass." Mr. L. de Nicéville (J. A. S. Beng. 1885, 42) found the ocellated brood not uncommon during the rainy season in the Calcutta district, and the unocellated form being common during the cold and hot weather, and in 1886 reared the unocellated form during November, from eggs deposited by a female of the previous wet-season form. Specimens of both the wet and dry-season forms from Malda, taken by Mr. Irvine, are in Col. Swinhoe's and Mr. Hampson's collections. In Cachar, according to Mr. Wood-Mason (J. A. S. Beng. 1887, 348) "eleven males and one female of the ocellated form obtained around Silcuri between May 27th and June 28th, and of the unocellated form two males only were obtained near Silchar on April 3rd." Specimens from Shillong, in the Kasia Hills, are in Mr. P. Crowley's cabinet. From Burma, I possess specimens of the wet-season form, taken in September in the Chittagong Hills. In the Shan States it was found to be very common by Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 517). According to Major C. H. E. Adamson (Notes on Burmese butterflies), the "ocellated form is very common

throughout Burma from May to October, and the unocellated form during the dry season." It was obtained by Mr. Otto Limborg in Upper Tenasserim from "Moulmein to Meetan" (P. Z. S. 1878, 825); Dr. J. Anderson took the dry-season form in the Mergui Archipelago during December (J. Linn. Soc. 1886, 32).

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant (Rhop. Malayana, p. 53) records it from the Malay Peninsula. It also occurs at Penang. In my own possession are specimens of the wet-season form (*blasius*) from Singapore, Sumatra, Java, Belitong, Borneo, Philippines, Hainan, and Formosa, those from the two latter islands having been taken by the late Mr. R. Swinhoe.

CALYSISME PERSEOIDES.

WET-SEASON BROOD? (Plate 60, fig. 2, 2a, ♂ ♀).

IMAGO.—Male and female. Upperside olivescient ochreous-brown. *Forewing* with a dusky transverse discal line, and a large median ocellus. *Hindwing* with a small indistinct lower median ocellus. Underside pale virescent-brown in male, paler and more olivescient ochreous-brown in female; both wings with a slender indistinct dusky transverse subbasal line, and a pale ochreous-bordered well-defined discal line; marginal lines slender. *Forewing* with a linear series of five moderately small distinctly-formed ocelli, of which the fourth is largest. *Hindwing* with seven somewhat linearly disposed well-defined moderately small ocelli, all encompassed by a pale outer line. *Male* with a short glandular patch of *bright ochreous-brown* scales above the submedian on underside of the forewing; and on the hindwing, above, with a subbasal tuft of yellow hairs overlapping a glandular patch of *black* scales.

Expanse, ♂ $1\frac{6}{8}$, ♀ $1\frac{7}{8}$ inch.

DRY-SEASON BROOD (Plate 60, fig. 2b, c, ♂ ♀).

IMAGO.—Upperside with a minute subapical ocellus, the median ocellus somewhat larger. Underside pale olivescient ochreous-brown; transverse subbasal and discal line less defined, the latter with slight pale outer vein points; the five linearly-disposed ocelli on forewing and the seven on the hindwing very minute, being indicated by black dots with white pupil; marginal denticular line indistinct. *Male* with a short glandular patch of *bright ochreous-brown* scales on underside of forewing, and the black patch on the hindwing, as above.

Expanse, ♂ $1\frac{6}{8}$, ♀ 2 inches.

HABITAT.—Lower Burma.

Distinguishable from Burmese examples of *C. Persens*, on the upperside, by the large ocellus on the forewing, and on the underside by the pale-bordered transverse discal band; the series of five ocelli on the forewing and their more linear sequence. On the underside the male is very similar to that sex of the wet-season brood of *C. Horsfieldi* (described further on, among the allied Indo-Malayan species of *Calysisme*),

being of like colour, width of transverse band, the same number and size of ocelli on the forewing, and their same linear sequence on both wings, but in *C. Horsfieldi* the glandular patches are ochreous, and that on the upperside of the hindwing is very prominent, and moreover is abnormally prolonged between the two subcostal branches to about half-way from the outer margin of the wing. Although here indicated as a distinct species, it is doubtful whether the male and female described and figured as representing examples of a wet-season brood may not eventually prove to be those only of an early emergence or variety of the dry-season brood.

DISTRIBUTION.—The males on Pl. 60, fig. 2 and 2b, were taken at Rangoon by Mr. Noble and are in Col. Swinhoe's collection, the latter specimen being obtained in December; fig. 2a is a female from Toungu in my own possession, and fig. 2c is also of a female, taken at Mepley in February (Marshall) also in Col. Swinhoe's collection.

CALYSISME POLYDECTA.*

WET-SEASON BROOD (Plate 61, fig. 1, 1a, b, c, d, e, f, g, h, ♂ ♀).

Papilio Justina, Cramer, Pap. Exot. iv. pl. 326, fig. c. ♀ (1780).

Mycalasis Justina, Hübner, Verz. bek. Schmett. p. 55 (1816).

Calysisme Justina, Moore, Trans. Ent. Soc. Lond. 1880, p. 161.

Calysisme Drusia Moore, Lep. Ceylon, i. p. 20, pl. xi., fig. 3, 3a. ♂ (1880).

Calysisme Mineus, Moore, Lep. Ceylon, i. p. 22, pl. xi., fig. 4, 4a, b. ♂ ♀ (1880).

Mycalasis (Calysisme) Mineus (part), Marshall and de Nicéville, Butt. of India, etc. i. p. 117 (1883).

Mycalasis (Calysisme) Mineus, form *Justina*, Hampson, Journ. Asiat. Soc. Bengal, 1888, p. 348.

IMAGO.—Male. Upperside dark brown; marginal lines paler; cilia cinereous-brown. *Forewing* palest externally beyond the slightly indicated transverse discal line; with a moderately large distinctly formed median ocellus with yellowish outer ring (much larger than in the males of the wet and dry-season brood of *C. Blasius*) the surrounding area being slightly ochreous tinged. *Hindwing* with, or without, a very small lower median ocellus; and with a subbasal tuft of yellow hairs overlapping a glandular patch of blackish scales. Underside dark umber-brown, sometimes of a vinaceous tint. Both wings with a prominent broader transverse discal virescent-white band than in *C. Blasius*; marginal lines ochreous. *Forewing* with a moderately large subapical and larger median ocellus, each encircled by a narrow virescent-grey outer ring; a small glandular patch of blackish scales on the middle of the submedian vein. In some southern Ceylon specimens of the male (figured in Lep. of Ceylon, pl. xi. fig. 4, 4a)—probably hybrids between *Blasius* and *subdita*—there is a minute ocellus attached beneath the subapical, and a similar minute one also attached above and another beneath the median ocellus, each set being either separately encircled by the violet-grey outer ring or all encompassed within it; in

* *Polydecta* being the oldest name for this species, it is therefore here used.

these specimens the glandular patch is also blackish. *Hindwing* with seven ocelli, more prominent and somewhat larger than in *C. Blasius*, encompassed within a narrow violet-grey outer line, the second, third, and seventh ocellus minute.

Female. Upperside with the pale transverse broad discal band of the underside distinctly visible on both wings. *Forewing* with a large median ocellus surrounded by a slightly paler area. Underside. Both wings with very prominent broad violet-white discal band; marginal lines ochreous. *Forewing* with two ocelli, and hindwing with seven prominent ocelli, as in male. In some Ceylonese specimens of this sex, of the wet-season brood, there are two small subapical ocelli on the forewing, and in others all the ocelli are smaller and those on the forewing with two minute intervening ocelli; this latter specimen (Plate 61, fig. g.) fairly agreeing with Cramer's figure of *Polydecta*, and which evidently represents an early dry-season specimen, but overcoloured by his artist.

Expanse, $1\frac{5}{8}$ to 2 inches.

DRY-SEASON BROOD (Plate 62, fig. 1, 1a, b, c, d, e, f, g, h, i, ♂ ♀).

Papilio Polydecta, Cramer, Pap. Exot. ii. pl. 144, fig. e, f, ♀ (1777).

Calysisme Polydecta, Moore, Trans. Ent. Soc. Lond. 1880, p. 162.

Mycalesis Polydecta, Westwood, Gen. Diurnal Lep. p. 393 (1851); Butler, Catal. Satyr. Brit. Mus. p. 135 (1868).

Mycalesis (Samanta) Polydecta, de Nicéville, Trans. Ent. Soc. Lond. 1884, p. 83, pl. 3, fig. 2, ♂, fig. 1, ♀.

Calysisme Perseus, Moore, Lep. of Ceylon, i. p. 21, pl. 12, fig. 1, 1a, ♂ (1880).

Mycalesis (Calysisme) perseus, form *subfasciata*, Hampson, Journ. Asiat. Soc. Bengal, 1888, p. 348.

IMAGO.—Male. Upperside ochreous-brown; exterior margins and cilia cinereous-brown. *Forewing* with the transverse discal line distinct but diffused; the median ocellus large, white pupilled and ringed with yellow, its bordering area also generally yellowish and forming a more or less defined quadrate patch: sometimes there is also a minute subapical ocellus present. *Hindwing* sometimes with a minute median ocellule or white dot; a subbasal radiating tuft of yellow hairs overlapping a small glandular patch of blackish scales. Underside either dark ochreous-brown or shades of dark greyish-brown, thickly speckled with darker brown; the basal area darkest; the subbasal transverse line sometimes slightly pale bordered; the transverse discal line generally well-defined and pale bordered, and in some there are indications of pale external vein points, also in some specimens a paler or brighter ochreous tint suffuses the middle of the outer border of the discal line on each wing. *Forewing* with four, and hindwing with seven small ocelli, or minute blackish spots with white pupils—when the three or four lower spots on the hindwing are generally the most distinct; beyond these the marginal lines are ill-defined, or sometimes a submarginal series of delicate denticules are present.

Female. Upperside ochreous-brown; exterior margins cinereous-brown. Forewing less acute at the apex than *C. Perseus*; the ocellus generally with the quadrate yellowish bordering area. Hindwing with, or without, a very small blackish ocellule between the lower medians. Underside rufescent-brown, speckled with darker brown; basal area very slightly darker; the transverse lines more or less defined; the ocelli small or indicated only by minute black spots with white pupils, the three lowest on the hindwing being then generally the most prominent. Body beneath, legs, and sides of palpi pale ochreous or greyish-brown.

Expanse, ♂ $1\frac{4}{8}$ to $1\frac{6}{8}$; ♀ $1\frac{7}{8}$ to $2\frac{1}{8}$ inches.

HABITAT.—Eastern, Central, and Southern India; Ceylon.

Individuals of the dry-season brood of *C. Polydecta* are distinguishable from those of the dry-season brood of *C. Perseus* by the large pale-bordered ocellus on the upperside of the forewing, and in the hindwings of both sexes having a scalloped exterior margin, which latter is very prominent in most of the females.

Specimens of the dry-season brood of this species, collected by Mr. E. E. Green at Pundaloya in the West-Central division of Ceylon, are, in both sexes, darker coloured on the underside than the Continental Indian examples, and have a pale more or less ochreous fascia to the transverse discal line; in one of the males there are four small ocelli on one side and five on the other forewing, and those on the hindwing are also more developed than in ordinary specimens of this brood. Other similar males and females in Mr. J. Jenner Weir's collection from the same locality, Pundaloya, have each five very small ocelli in a linear sequence all on the underside of the forewing. All the males have a short blackish glandular patch on both fore and hindwing, and are the same as that figured by Mr. de Nicéville (Trans. Ent. Soc. Lond. 1884, pl. 3, f. 2) as representing the male of *C. Polydecta*.

HISTORICAL NOTE.—Cramer's figures of *Polydecta* (Pap. Exot. 11, pl. 144, f. e, f) represent a female (which has evidently been over-coloured by his artist), and is doubtless that of a specimen of an early dry-season or so-called unocellated brood, in which the ocelli on the underside of both wings are much reduced in size, or are undeveloped, and disposed in a more linear sequence. *Polydecta* is an undoubted Calysisme, and not a Samanta, as stated by Mr. de Nicéville in his paper on this species in Trans. Ent. Soc. Lond. 1884, p. 88. Cramer's figure shows four small ocelli on the underside of the forewing, the lower two of which are correctly disposed between the median branches and the upper two between the upper median and upper radial. In Mr. de Nicéville's representation of this figure in the paper above mentioned (Plate 3, fig. 1) and there given as a true copy of Cramer's figure, the details of the veining and positions of the ocelli on the underside of the forewing has been incorrectly copied by his artist, as may easily be seen by reference to Cramer's original figure. In Mr. de Nicéville's copy (Plate 3, fig. 1) the lower ocellus on the forewing is represented as being situated between the submedian vein and lower median branch,

and the upper ocellus as occurring between the upper median and lower radial; the upper radial veinlet being moreover here omitted altogether. These inaccuracies can be easily tested by comparison with the veins on the opposite or upperside side of the same figure (fig. 1) of the same plate, where they are correctly given. It has been necessary to point out these inaccuracies in Mr. de Nicéville's reproduction of Cramer's figure, inasmuch as our own identification of the species (*polydecta*) mainly rests on the position and the number of the ocelli on the underside of the forewing, and, though the errors in the figure here noted are evidently those of the artist, they would, moreover, puzzle other less critical eyes more so than they have our own.

DISTRIBUTION.—Commencing Eastward. We have verified examples of the dry-season brood from Malda taken by Mr. Irvine, and from Barrackpore in the Calcutta district taken in November, both in the collection of Col. Swinhoe, as are also others from the Central Provinces, taken by Mr. Betham at Daolapur in November, and at Mahoda, also in November. From the Bombay district, examples from Wangni in the Thanna division, taken in November and December—the wet-season form having been taken by Col. Swinhoe in Bombay in August, and the dry-season form in November and at Poona in October. Southward, Mr. Hampson obtained on the Nilgiris the wet-season form from August to October, and the dry-season form from November to January. Dr. J. Shortt has taken the wet-season form on the Shevaroyes. It also occurs at Kallaur in Travancore in April. In Ceylon Mr. E. E. Green obtained the wet and dry-season broods at Pundaloya, in the West Central district.

Of the illustrations on our Plate 61 of *C. Polydecta*, figs. 1, 1a, b, d, represent a male and female of the *wet-season brood* from Travancore; fig. 1c, that of a Ceylon male; figs. 1e, f, a variety of the Ceylon male and female; figs. 1g, h, also of a Ceylon male and female, the latter fairly agreeing with Cramer's figure, and probably that of a specimen of an early emergence of the dry-season brood. On our Plate 62 are illustrations of the dry-season brood—figs. 1, 1a, of a Bombay male; figs. 1b, c, Nilgiri males; figs. 1d, e, Ceylon males; fig. 1f, a Nilgiri female; figs. 1g, h, Bombay females, and fig. 1i, a large Ceylon female variety.

CALYSISME MINEUS.

WET-SEASON BROOD (Plate 60, fig. 1, 1a, b, c, d, ♂ ♀).

Papilio Mineus, Linnæus, Syst. Nat. I. 2, p. 768 (1767); Fabricius, Syst. Ent. p. 488 (1775).

Mycalesis Minea, Hübner, Verz. bek. Schmett. p. 55 (1816).

Mycalesis Mineus, Butler, Catal. Satyr. Brit. Mus. p. 135 (1868); Catal. Fabrician Lep. Brit. Mus. p. 34 (1869). Moore, Proc. Zool. Soc. 1878, p. 825.

Calysisme Mineus, Moore, Trans. Ent. Soc. Lond. 1880, p. 161.

Mycalesis Mineus (part), Distant, Rhopal. Malayana, p. 50, pl. iv. fig. 13, ♂, (fig. 14, ♀), 1882.

Mycalesis (Calysisme) Mineus (part), Marshall and de Nicéville, Butt. of India, etc. i. p. 117 (1883); Doherty, Journ. Asiatic Soc. Bengal, 1886, p. 114; Elwes and de Nicéville, Journ. As. Soc. Bengal, 1887, p. 417; *id.* Trans. Ent. Soc. 1888, p. 304.

Papilio Drusia, Cramer, Pap. Exot. i. pl. 84, fig. c, d, (1775), ♀.

Mycalesis Drusia, Butler, Catal. Satyr. B. M. p. 133 (1868); Catal. Fabr. Lep. B. M. p. 33 (1869).

Calysisme Drusia, Moore, Trans. Ent. Soc. Lond. 1880, p. 161.

IMAGO.—Upperside olivaceous ochreous-brown; with a very indistinct pale transverse discal straight narrow fascia on both wings; marginal lines pale ochreous-brown. Cilia pale ochreous. *Forewing* with a prominent large ocellus between the lower median veins. *Hindwing* in male sometimes with a very small lower median ocellus, and in the female with one, or sometimes two indistinctly visible subanal ocelli. Underside cinerous-brown, with a more or less well-defined transverse discal ochreous-white or greyish-white band on both wings; marginal lunular lines ochreous-white and prominent. *Forewing* with a prominent small subapical ocellus, and a large lower median ocellus, each separately encircled by a greyish-white outer ring; very rarely a specimen occurs in which each ocellus has a minute attached ocellule, and then all are encompassed by the outer greyish-white line. *Hindwing* with seven prominent ocelli, of which the second, third, and seventh are the smallest, and all encompassed by a greyish-white outer wavy line. *Male*, on the upperside of the *hindwing* with a subbasal tuft of pale ochreous hairs overlapping a glandular patch of *blackish scales*; and on the underside of the *forewing* with a glandular patch of *blackish scales* on the middle of the submedian vein. The patch, as seen under the microscope, is composed of densely-packed but loosely raised, overlapping, large, broad, oval scales with even front edges. Compared with the patch of yellow scales on the forewing of *C. Visala*, that of *C. Mineus* is two-thirds less in size, the scales are less closely packed, are more laxly raised, and are narrower both anteriorly and posteriorly. Body beneath, legs, and streaks on sides of palpi pale cinereous-brown.

Expanse, $1\frac{6}{8}$ to 2 inches.

DRY-SEASON BROOD (Plate 60, fig. 1 e, f, ♂).

Papilio Otreia, Cramer, Pap. Exot. iv. pl. 314, fig. a, b, ♀ (1780); Hübner, Samml. Exot. Schmett. Zuträge, fig. 79, 80, ♂ (1818).

Papilio Mamerta, Cramer, Pap. Exot. iv. pl. 326, fig. d, ♀ (1780).

Mycalesis Mamerta, Butler, Catal. Satyr. Brit. Mus. p. 136 (1868).

Calysisme Mamerta, Moore, Trans. Ent. Soc. Lond. 1880, p. 162; Journ. Linn. Soc. Lond. Zool. 1886, p. 32.

Mycalesis Hamerta, Hübner, Verz. bek. Schmett. p. 55 (1816).

Mycalesis Ostrea, Westwood, Gen. Diurnal Lep. p. 394 (1851).

Calysisme Ostrea, Moore, Trans. Ent. Soc. Lond. 1880, p. 164.

Mycalesis subfasciata, Moore, Proc. Zool. Soc. 1882, p. 237, pl. 12, fig. 8, ♂.

Mycalesis (Calysisme) Perseus var. *subfasciatus*, Marshall and de Nicéville, Butt. of India, etc. i. p. 122 (1883).

Mycalesis Carpenteri, Butler, Ann. and Mag. Nat. Hist. 1886, p. 183, ♀.

IMAGO.—Male. Upperside olivescient ochreous-brown. *Forewing* with a large median ocellus ringed with yellow. *Hindwing* with a minute imperfect ocellus between the middle and lower median veins. Underside paler ochreous-brown, or greyish-brown; the basal area darkest, and slightly speckled externally; the transverse discal line more or less defined, and sometimes with a slight pale outer border; ocelli indicated by very small blackish spots with white central dot. The glandular patch with its overlapping yellow tuft on the upperside of the hindwing, and the patch on the underside of the forewing dark brown. Female. Upperside similar to the male. Underside more uniformly paler; brown speckled; the transverse discal line more or less diffused; ocelli very small, as in male.

Expanse, ♂ $1\frac{6}{8}$ to 2, ♀ 2 to $2\frac{1}{8}$ inches.

HABITAT.—Northern and Eastern India; Burma; Siam; S.-E. China.

HISTORICAL NOTE.—Of the identity of Cramer's *P. Drusia* with *P. Mineus* I have satisfied myself by actual comparison of South Chinese specimens, identical with the figures of *Drusia*, and with the type specimen of the Linnean *Mineus*, now in the cabinet of the Linnean Society of London. The locality given by both these authors for their species is "China," and the type specimen of both is that of a female. Of the Chinese specimens that have been under our personal examination—and the females of which represent the above-named species—all the males possess the small *black glandular patch* of scales on the underside of the forewing. The Linnean name therefore has been here assigned to the insect bearing the *black patch*, and not to its Indian ally possessing the *yellow patch*.

The dry-season brood of *C. Mineus* differs in both sexes from those of the dry-season form of *C. visala* in their comparatively smaller size, more rounded apex of the forewing, and more even exterior margin of the hindwing; the median ocellus on the upperside of the forewing is also of larger size, and on the underside of both wings the transverse subbasal and discal line are both generally much less defined. In addition to these differences, is the position, size, and colour of the glandular patch on underside of the forewing. This patch, present in the males of both the wet and dry-season brood, is, in *Mineus*, small and blackish, and situated on the middle of the submedian vein, whereas in *Visala* it is large, much longer, extending from middle of the vein to the discal band, and is of a yellow colour.

Of the illustrations of this species on our Plate No. 60, figs. 1, 1a, represent a *wet-season* male from the Naga Hills, fig. 1, c, that of a female from the N.-W. Himalayas, and fig. d, a female from Ranchi; figs. 1, e, f, represent *dry-season* males, the latter figure being from the Kangra type named *subfasciata*.

DISTRIBUTION.—So far as the personal verification of specimens from the localities subsequently referred to have shown, this species is confined, within our area, to North India and Burma. Commencing at the north-west, we find that it

occurs at Kangra, specimens of the wet-season form being in Col. Swinhoe's collection, and the dry-season form (*sulfasciata*) was obtained by the Rev. J. Hocking (P. Z. S. 1882, 237). Mr. Doherty, in his notes on the butterflies taken in Kumaon (J. A. S. Beng. 1886, 114) doubtless refers to this species (and not to its ally with the yellow glandular patch, with which he there associates it—the latter species, so far as is known to the author, does not occur in the N.-W. Himalayas). He remarks that “the wet-season form is commoner than *C. Perseus* in all the valleys up to 5000 feet, in August and September; the dry-season form first seen on the Lower Sarju about September 23rd;” the caterpillar taken in S. Orissa, and there described by Mr. Doherty as that of the present species, belongs to its ally. Col. A. M. Lang (Ent. Mo. Mag. 1864, 182) records *Drusia*, *Otrea*, and *Polydecta* [the latter probably *Blasius*] as being found in Oudh “appearing in autumn, of feeble flight, flapping weakly about near the ground and amongst long grass and low herbage.” The late Capt. de la Chaumette (Ent. Mo. Mag. 1865, 38) also gives *Drusia* and *Polydecta* as “occurring in Oudh,” and to their being “widely dispersed in the Central Provinces.” In his MS. notes of 1861, Capt. Chaumette also describes the larva as follows:—“*Caterpillar* after first moult, 4 lines long; ground colour bright apple-green, dorsal line dark green; incisions yellowish; on anal segment two little pointed protuberances; abdomen bright apple-green, ventral line dark green; legs green; head rough, pale plum colour, round beneath, flat above and terminating at top in two minute raised and pointed tubercles; stigmata brown, with a pale pupil. After last moult, length 10 lines to an inch; cylindrical and much attenuated posteriorly; rough; colours and general characters as after first moult. Habits lazy. Went into chrysalis August 22nd. *Chrysalis*,—pendular, short, thick, green. *Imago* emerged August 31st. Found on the wing from June to September in Lucknow.” But no specimens from these localities have been seen by the author, and their identity requires verification. Males and females of the wet-season form from Durbunga, in Behar, are in the British Museum Collection, and others from Ranchi, in Chota Nagpore, taken by Mr. Irvine in June, July, and August, are in Col. Swinhoe's collection. A single male of the wet-season form taken by Mr. Mowis, in Sikkim, is also in Col. Swinhoe's possession. Proceeding south-eastward, there are Cachar specimens of both sexes of the wet-season form in the British Museum; from the Naga Hills in the collection of Mr. Jenner Weir, and of Mr. Crowley, the latter also possessing both broods from the Karen Hills. Specimens of both sexes of the wet-season form, from Chittagong and Maudalay, are in the author's possession. In the British Museum are examples of the wet-season form and of the dry-season form (*Carpenteri* Butler) from Pegu. In Rangoon, the wet-season form was taken by Mr. Noble in June (Coll. Col. Swinhoe). In Upper Tenasserim, Mr. Limborg (P. Z. S. 1878, 825) obtained the wet-season form “from

Moulmain to Meetan, at Meetan 3000 feet, and at Tao 3000 to 5000 feet in March."

DISTRIBUTION OUTSIDE INDIAN AREA.—Mr. Distant (Rhop. Malayana, p. 52) records it from the Malay Peninsula. Specimens of the wet-season brood have been verified from Malacca, Penang, and Sumatra, in the British Museum Collection. Mr. Druce (P. Z. S. 1874, p. 101) records the dry-season form from Chentaboon in Siam. Both Linnæus and Cramer give "China" as the locality of the species. Specimens of both sexes of the wet-season brood labelled "China" are in the British Museum; and also from Hong Kong, both in the British Museum, and in the collection of Mr. Jenner Weir, the latter specimens taken by Bishop Smith—these Chinese specimens being identical with the Linnean type. Specimens from Hainan and from Formosa (P. Z. S. 1866, 360), taken by the late Mr. Robert Swinhoe, are in the author's possession.

CALYSISME NICOBARICA.

Mycalesis Drusia (part), Moore, Proc. Zool. Soc. 1877, p. 583.

Mycalesis (Calysisme) Drusia, Wood-Mason and de Nicéville, Journ. Asiat. Soc. Bengal, 1881, p. 230; *id.* 1882, p. 16.

WET-SEASON BROOD.

IMAGO.—Both sexes distinguishable from *C. Minens* by their darker colour, especially that of the underside. On the underside the colour is much deeper, and of a purpureous-brown tint; the ocelli are extremely prominent, those on the forewing larger and of which there are only two, the upper and the lower. On the hindwing the upper ocellus and the fourth and fifth are also larger, the upper second and third being either obsolete or incipiently represented in the male, and extremely minutely developed in the female. The transverse band in the male is narrow, but broader in the female. The glandular patch of scales on the underside of the forewing, and also that on the upperside of the hindwing, in the male, is black.

Expanse, ♂ ♀ 1½ to 2 inches.

HABITAT.—Nicobar Islands.

DISTRIBUTION.—Numerous specimens are in the author's collection, received from Mrs. de Roëpstorff, from the Islands of Kamorta, Nankowri, Pulo Kondul, and Great Nicobar, Kar Nicobar, and Katschall. Specimens are also in the collections of the British Museum, Indian Museum, Calcutta, and Colonel Swinhoe, from the Nicobars.

CALYSISME INTERMEDIA.

WET-SEASON BROOD.

IMAGO.—Male. Upperside dark brown. *Forewing* with slight indication of transverse discal line, and a prominent moderately-large median ocellus. *Hindwing*

with a minute lower median white dot. Underside olivescens-brown, the transverse discal band ochreous-white, narrower than in *C. Mineus*, but not prominent; marginal lines pale ochreous. *Forewing* with a moderate-sized subapical ocellus, and a large median ocellus, each encompassed by a pale violet-grey outer line. *Hindwing* with seven ocelli, the second, third, and seventh minute. Underside of forewing with an elongate dark brown glandular patch of scales, the patch nearly twice the size and length of that in *C. Mineus* and occupying a similar position on the submedian vein, but is composed of somewhat longer scales, which are also narrower and anteriorly more curved; the patch on the upperside of the hindwing also composed of similar shaped scales, and overlapped by the subbasal tuft.

Expanse, ♂ 2 inches.

DRY-SEASON BROOD.

IMAGO.—Male. Upperside as in the wet-season brood. Underside paler and ochreous-brown, with numerous slightly darker indistinct short strigæ, the transverse discal line slender and very slightly or not pale bordered, and sometimes with slightly indicated pale outer vein points; in others the discal line is darker and well defined. *Forewing* with the two ocelli indicated by minute white dots, or sometimes four are more or less apparent. *Hindwing* with seven minute white dots. The elongate glandular patch of the same size and composed of the same shaped scales as in wet-season brood.

Female. Upperside. *Forewing* with a somewhat larger median ocellus. *Hindwing* with an indistinct minute median ocellus. Underside pale brownish-ochreous, with numerous indistinct slightly darker brown strigæ; discal transverse line slender, slightly pale bordered, and sometimes with slight vein points; ocelli on both wings minute, represented by dusky dots with white pupil, the fifth most distinct.

Expanse, ♂ $1\frac{3}{4}$ to 2, ♀ 2 to $2\frac{1}{2}$ inches.

HABITAT.—Tenasserim.

Both sexes of the dry-season brood of this species are distinguishable from those of the dry-season brood of *C. Perseus*, by the much larger size of the median ocellus on the upperside of the forewing, both sexes on the underside also having the subbasal and discal transverse line more linear, in addition to the difference of size of the glandular patch and form of its scales, in the male.

DISTRIBUTION.—The male of the wet-season form here described is in the British Museum Collection, and is labelled as from "Silhet" and obtained by Mr. Stainforth; the locality, however, is very doubtful, as that gentleman's collection was from various other localities. The dry-season form, of which there are both sexes, are from the Thoungyeen Valley, Tenasserim, and others, obtained by Dr. J. Anderson from the Mergui Archipelago, are in the author's possession.

CALYSISME VISALA.

WET-SEASON BROOD (Plate 63, fig. 1, 1a, b, c, d, e, f, g, h, ♂ ♀).

Mycalesis Mineus (part), Moore, Proc. Zool. Soc. 1878, p. 825.

Mycalesis Mineus, de Nicéville, Journ. Asiat. Soc. Bengal, 1885, p. 42; *id.* 1886, p. 235.

Mycalesis (Calysisme) Mineus (part), Marshall and de Nicéville, Butt. of India, etc. i. p. 117 (1883).

Elwes and de Nicéville, Journ. Asiat. Soc. Beng. 1887, p. 417. Elwes, Trans. Ent. Soc. 1888, p. 304. Hampson, Journ. Asiat. Soc. Bengal, 1888, p. 348.

IMAGO.—Male. Upperside brown. *Forewing* somewhat more acute at the apex, with an ocellus similar but slightly larger than in *C. Mineus*. *Hindwing* with an elongated glandular patch of pale yellow scales, overlapped by the subbasal yellow tuft; these scales being of exactly the same size, form, and disposition, as those present on the patch on the underside of the forewing here described, the overlapping hairy tuft consisting of long straight filaments, each arising from a distinctly visible minute round pore. Underside similar to *C. Mineus*, the transverse discal pale ochreous-white band narrower. *Forewing* with a similar subapical and a large lower ocellus, each encircled by a pale violaceous outer ring; the glandular patch on the submedian vein is two-thirds larger than that in *C. Mineus*, extending from the middle of the vein to the transverse discal pale band, and is composed of pale yellow scales; these scales (as seen under the microscope) are very densely packed, overlap each other, and slightly raised, are large and rather long, broad and somewhat broadest anteriorly, with evenly-rounded front edge, and very short peduncle; no slender intervening scales present;—this patch in *C. Mineus* being short, situated on the middle of the vein, and composed of different shaped blackish scales. *Hindwing* with similar ocelli to *C. Mineus*.

Female. Upperside. *Forewing* with more acute apex than in *C. Mineus*, the ocellus also larger. *Hindwing* with two median ocelli. Underside paler than in male; the transverse discal band narrow; ocelli the same as in male, and in some specimens the subapical has a minute lower attached ocellule.

Expanse, ♂ 1 $\frac{1}{8}$, ♀ 2 inches.

DRY-SEASON BROOD (Plate 64, fig. 1, 1a, b, c, d, e, f, g, h, i, ♂ ♀; larva and pupa).

Mycalesis Visala, Moore, Catal. Lep. Mus. E. I. C. i. p. 230 (1857). Butler, Catal. Satyr. Brit. Mus. p. 133 (1868).

Calysisme Visala, Moore, Trans. Ent. Soc. Lond. 1880, p. 164.

Mycalesis Perseus, var. *Visala*, Marshall and de Nicéville, Butt. of India, etc. i. p. 121, pl. 16, f. 52 (1883).

Calysisme indistans, Moore, Trans. Ent. Soc. Lond. 1880, p. 164 ♂ ♀; Journ. Linn. Soc. Lond. Zool 1886, p. 32.

Mycalesis Perseus, var. *indistans*, Marshall and de Nicéville, Butt. of India, etc. i. p. 122 (1883).

Mycalesis (Calysisme) Mineus, form *indistans* et *visala*. Hampson, Journ. Asiat. Soc. Bengal, 1888, p. 348.

IMAGO.—Male and female. Upperside dark ochreous-brown, with distinct

cinereous-brown outer margins. *Forewing* more or less angular at the apex, and darker brown before the exterior margin; with a very large median, black, white pupilled ocellus with yellow outer ring, which sometimes has a minute upper, and in some specimens both an upper and a lower, minute ocellule attached to it, and enclosed within the yellow ring; a minute subapical ocellus also sometimes present; transverse discal line distinct. *Hindwing* with, or without, a single very minute subanal white dot in the male, and two in the female. Underside either pale brownish-testaceous or various shades of cinereous-ochreous, greyish-brown, with a more or less distinct dark brown slender subbasal line and a discal transverse line, both being rarely slightly denticulated, also, sometimes the discal line is even and slightly pale bordered, or again, is dark brown and forming a suffused darker fascia. *Forewing* with two or four, indistinct very minute white-pupilled blackish spots, the lowest sometimes more prominent and larger. *Hindwing* with a series of seven white-pupilled spots, of which the third, and sometimes the three from the anal angle are larger and blind or more fully developed, the others very minute; beyond is a submarginal row of indistinct blackish minute slender denticules, or marginal lines. In some of the specimens of both sexes of this brood reared by Mr. de Nicéville in Calcutta, the ocelli on underside of both wings are more or less fully developed, though of course small. *Male* with an elongate yellow glandular patch of scales on the submedian vein on the underside of the forewing, and on the upper-side of the hindwing a similar ochreous coloured patch overlapped by a subbasal tuft of yellow radiating hairs.

Expanse, ♂ $1\frac{5}{8}$, ♀ $2\frac{2}{8}$ inches.

HABITAT.—North-Eastern, Central, and Southern India; Burma.

EGG.—“Almost white, semitransparent; laid singly or in batches on both sides of blades of grass.”

YOUNG CATERPILLAR.—“Pale green; head black, bearing two very obtuse black horns on the crown, and with the caudal processes very small.”

ADULT CATERPILLAR.—“After last moult pale reddish, finely mottled with greenish ochreous and other colours. When full-grown about $1\frac{1}{4}$ inch long, fusiform; anal segment with two short divergent processes; dorsal line very pale greenish; with lateral oblique obscure darkish stripes; head blackish, armed with two divergent blunt conical reddish horns; both head and horns thickly set with small rough tubercles; the face covered with short hairs; the whole body rough or rugose and very thickly set with minute tubercles; legs and underside of body coloured like the upper surface.”

CHRYSLIS.—Suspended by tail. “Semitransparent green; smooth; thorax very convex and constricted at base of the abdomen; spiracles black.” (L. de Nicéville.)

Both sexes of the dry-season brood of this species differ from those of the dry-

season brood of *C. Mineus* in their general larger size, more angular apex to the forewing, and uneven exterior margin of the hindwing. On the forewing above, the median ocellus is conspicuously of larger size. On the underside, the transverse subbasal and the discal line are both well defined and prominent. The male is distinguishable by having the *glandular patch* on both wings clothed with scales of a yellow colour (not blackish, as in *C. Mineus*), the patch on the underside of the forewing being also of much greater length, and extending upon the submedian vein from the middle to the transverse discal line, and it is moreover, composed of differently shaped scales. According to Mr. de Nicéville (Butt. Ind. i. 122) "specimens (of the dry-season form) taken in Lower Bengal (named *indistans*) are paler coloured both on the under and upperside than in those from the Sikkim Himalayas. This variety (*indistans*) is developed in the plains of N.-E. India, and is most distinctly specialized in the district of Calcutta. It is found as far south as Orissa, and as far north as Upper Assam, but in these localities it is less distinct, specimens from Assam being almost if not quite inseparable from Sikkim examples."

Of the illustrations on our Plate 63, of the wet-season brood of *C. visala*, fig. 1 represents a Sikkim male; fig. 1a, the fore and hindwing of male, showing the glandular patches; figs. 1, b, c, a Calcutta female; figs. 1, d, e, Calcutta males; and figs. 1, f, g, h, Nilgiri males. On Plate 64, representing the *dry-season brood*, figs. 1, 1a, b, are Sikkim male and female (these being the types of the form named *Visala*); figs. 1, c, d, are Calcutta male and female (the types of the form named *indistans*); fig. 1, e, the larva and pupa (reproduced from Mr. de Nicéville's figures in Journ. As. Soc. Beng. 1886, pl. 12), and figs. 1, f, g, h, are males and female from the batch reared in Calcutta by Mr. de Nicéville, in October, 1885, from eggs deposited by a female of the previous wet-season brood, and which have been kindly sent to me for examination; fig. 1, i, is that of a Nilgiri male from Mr. Hampson's Collection.

DISTRIBUTION.—Commencing on the north-east, specimens have been verified of both sexes of the wet-season form from Sikkim, taken by Mr. Paul Mowis in May, and a male from Buxa in Bhotan; also of the dry-season form from the Sikkim Terai, taken in September, October and December, and in the Runjit Valley, 1200 to 3500 feet, in October, in Col. Swinhoe's Collection. Mr. Elwes (Tr. Ent. Soc. Lond. 1888, 304) remarks that "Mr. de Nicéville's experiments in breeding have thrown some light on the seasonal forms of this species in Calcutta, but I cannot say to what extent his conclusions are borne out in the different climate of Sikkim. Mr. Otto Möller, however, has little doubt that the *M. Visala* is the dry-weather form, and finds it commonly from the Terai up to about 5000 feet, at the end of the rains and on to December. The ocellated form he takes at the same elevations from April to September. I hardly think that the various broods will prove to be constantly

distinguishable from each other, except in localities where the seasons are better marked than in Sikkim." Mr. de Nicéville (Butt. Ind. i. 122) says that the dry-season form "is the commonest in the Sikkim Terai and Hills, and that it occurs also in Upper Assam." Mr. J. Wood-Mason (J. A. S. Beng. 1887, 348) records "seventy-five males, and seventeen females of the wet-season form from Cachar, taken in Silcui and the forests around between 26th May and 25th August; a single male of the dry-season form being obtained in Silchar on 3rd April." The dry-season form has been taken at Malda by Mr. Irvine (Coll. Swinhoe). From the Calcutta district we possess males and females of the wet and dry-season forms, taken by the late Mr. W. S. Atkinson, A. E. Russell, and more recently by Mr. Charlton Swinhoe. Mr. Rothney (Ent. Mo. Mag, 1882, 34) records it as common at Barrackpore, near Calcutta, "being fond of shade, and settling mostly in long grass." Mr. de Nicéville (J. A. S. Beng. 1885, p. 42) states that the ocellated form is "not uncommon during the rainy season," and the unocellated form "common during the cold and hot weather." Examples of the wet-season form from Durbunga in Behar are in the British Museum. Examples of the wet season form from Pachmari in Central India, taken by Mr. Betham in October, are in Col. Swinhoe's collection. From the Bombay district, specimens of the wet-season form taken by the late Dr. Leith, and by Col. Swinhoe in August, are in the author's collection, and also of the dry-season form taken at Wangni in the Thannah district in November. These Bombay examples, of both the wet and dry-season forms of this species, are much smaller than both the North and South Indian specimens, the males measuring only $1\frac{1}{2}$ and the females $1\frac{1}{2}$ to $1\frac{3}{4}$ inch in expanse. From S. India, a male of the wet-season form, taken at Eridge in Trevandrum by Mr. H. S. Fergusson, is in Col. Swinhoe's Collection, and is identical in size and markings beneath with the same sex from Calcutta. Mr. Hampson (J. A. S. Beng. 1888, 348) obtained it on the Nilgiris, taking the wet-season form, as recorded in his MS. notes, from July to September, and the dry-season form (which are smaller than N. Indian examples) from October to February. In Burma, Mr. O. Limborg (P. Z. S. 1878, 825) took it "at Moulmein, Meetan 3000 feet, and Tao 3000 to 5000 feet, in March;" the dry-season form has also been taken in the Thoungyeen forest, Tenasserim; and numerous specimens were obtained by Dr. J. Anderson (J. Linn. Soc. Lond. 1888, 32) from December to March, in the Mergui Archipelago.

LIFE-HISTORY OF THE DRY-SEASON BROOD.—In the Journal of the Asiatic Society of Bengal, 1886, p. 236, Mr. de Nicéville (pl. xii. f. 3) figures the larva and pupa of this species, and gives the following details of the result of his breeding experiment of the dry-season brood in Calcutta. "On Sept. 1st I placed two female *M. Mineus* [the males of which have yellow patches on the wings] in a breeding-cage with glass top and sides, into which I had previously introduced a pot of growing grass. The

same evening the insects laid about 30 eggs singly and in batches on both sides of the blades of grass indiscriminately. The eggs are almost white, shining, and semitransparent. On Sept. 5th, one female died, and her body on being opened was found to be quite empty and devoid of eggs. On Sept. 6th, the other female died, and most of the eggs hatched. As usual the *young larvæ* made their first meal off the empty egg-shells. They are pale green with a black head bearing two very obtuse black horns on the crown, and with the caudal processes very small. Down to the last change of skin, the *larvæ* are pale green without any conspicuous markings; after that change they become pale reddish, finely mottled with greenish, ochreous, and other colours, the general effect being somewhat that of the brownish colour of a grass stalk to which the bases of the dead leaves are attached. At this stage, the *larvæ* remain chiefly amongst the bases of the grass stalks, where they are very difficult to be seen. When full grown, they are about $1\frac{1}{4}$ inches long; the first segment is somewhat narrower than the head, the body gradually thickens to the middle, and then equally regularly and gradually tapers to the anal segment, which is furnished with two short, slightly divergent pointed processes or tails; there is a very faint greenish dorsal line, with about six obscure darkish oblique streaks at the sides, the four middle ones of which are the most prominent; the head is blackish, armed with two divergent, blunt, conical horns, which are obscure reddish like the body; both head and horns are thickly set with small rough tubercles, and the face is covered with short hairs; the whole of the body is very rough or rugose, and very thickly set with minute tubercles; the legs and underside of the body are coloured like the upper surface. The *pupa* is usually pale semitransparent green without markings, quite smooth, with the thorax very convex and constricted at the base of the abdomen, and with the spiracles black. I obtained one differently coloured pupa: this was rich reddish-brown, with the spiracles prominently bright yellow. The *larvæ* turned to pupæ between Sept. 28th and October 4th, and the butterflies emerged between October 5th and October 12th. The imagines, though variable, were all nearer to *M. indistans* than to *M. mineus*, while the majority were true *M. indistans*."

Mr. W. Doherty (Journ. Asiatic Society Bengal, 1886, p. 114) gives the description of a caterpillar, assigned by him to be that of *M. mineus*, but whether of the wet or dry-season brood is not stated, as follows:—"Caterpillar taken by me in a meadow at Sonakala, in Southern Orissa. It is fusiform, brownish-green, tapering greatly at both ends. Head rather large, finely pubescent, dark fuscous marbled with paler, a smooth plate in the middle of the forehead, two short, rough triangular horns; neck greatly constricted; body rough and prickly rather than pubescent, finely wrinkled transversely, six wrinkles to each segment, the second twice as broad as the others; a faint darker dorsal line chiefly visible posteriorly; a lateral line of

oblique dark streaks, one to each segment; last segment prolonged and ending in two rough, triangular, slightly divergent horns. It has the habit of resting for hours with its chin strongly retracted, and its horns projecting forwards. The fourth eye [?] from above is very much larger than the others, and the head with its short ear-like horns looks very much like a cat's. Before undergoing its metamorphosis, the larva became in colour a clear transparent green, unmarked except by the black dots of the spiracles. Chrysalis green, smooth, its envelope transparent, shorter and thicker than the chrysalis of *Melanitis*, strongly constricted between the thorax and abdomen. The caterpillar feeds on various grasses, and is strictly nocturnal."

Messrs. J. Davidson and E. H. Aitken, in their "Notes on the Butterflies of the Bombay Presidency," also give a description of the larva [presumably of *visala*] under their name of *mineus*, as follows:—

"*Larva* spindle-shaped; head larger than neck and surmounted with two short protuberances; last segment elongated and ending in two fine points; colour some shade of brown with a lateral dark line, sometimes indistinct, formed by a chain of minute cruciform marks. This colour is assumed when the larva is half-grown; at first it is green with a black head. *Pupa* oval, without angle or irregularity of any kind, very like that of *Melanitis*, but proportionally thicker, light green with a pale line across the wing-cases. We got one specimen on Rice, in July, and a dozen the following June, from eggs laid by the unocellated form in captivity." (Journ. Bombay Nat. Hist. Soc. 1890, p. 267.)

CALYSISME SUBDITA.

WET-SEASON BROOD (Plate 65, fig. 1, 1a, b, c, d, ♂ ♀).

IMAGO.—Male and female. Upperside dark olivescient ochreous-brown, with a very faint pale transverse discal narrow fascia, and distinctly paler marginal lines; both most apparent in the female. Cilia cinereous-ochreous. *Forewing* more rounded at the apex than in *C. visala*; with a large prominent median ocellus. *Hind-wing* with one, occasionally two, small slightly defined median ocelli. Underside dark greyish ochreous-brown or fuliginous-brown; with a well-defined whitish transverse discal band, and marginal ochreous lines. *Forewing* with one small subapical ocellus and two conjoined lower median ocelli, the latter pair being disposed one between the middle and lower medians (which is the largest) and the other between the lower median and the submedian vein; the lowest ocellus, i.e., that between the median and submedian, being small and *always present in both sexes*; both the upper and lower series are separately encircled by a pale greyish-white outer line. In some specimens, but rarely, there is a minute more or less complete

contiguous ocellus between the middle and upper medians, and encircled within the pale outer line of the lower series. Again, rarely also a specimen of the female occurs, in which there is an additional upper minute ocellus (making six) disposed above the upper radial veinlet. *Hindwing* with seven prominent black ocelli, encompassed by a greyish-white wavy outer line. *Male*, on the underside of the forewing, with an elongated glandular patch of *ochreous yellow* scales upon the submedian vein extending from its middle to the discal pale band; and on the hindwing, above, with a subbasal tuft of pale hairs exerted or overlapping a glandular patch of *ochreous yellow* scales.

Expanse $1\frac{7}{8}$ to 2 inches.

DRY-SEASON BROOD (Plate 65, fig. 1, e, f, g, h, ♂ ♀).

Male and female. Upside similar to the wet-season brood. Underside paler in colour, either of a greyish or ochreous brown; the transverse discal whitish line very narrow, but distinct; the ordinary subbasal transverse wavy line generally apparent. *Forewing* with five very small ocelli disposed as in the ocellated brood, those of the female minute or anteriorly represented by white dots, the lowest one situated between the lower median and submedian vein being always present or indicated in both sexes. *Hindwing* with the ocelli also minute or anteriorly indicated by a white dot. *Male* with an elongated glandular patch of *yellow scales* on underside of the forewing, and a *yellow patch* overlapped by the subcostal tuft on upperside of the hindwing.

Expanse $1\frac{7}{8}$ to 2 inches.

HABITAT.—South India; Ceylon.

DISTRIBUTION.—Of the ocellated form, males and females from Travancore and Cochin are in the author's possession, and also of the unocellated form taken in the Travancore Hills from 1700 to 3000 feet in March and April. Females of the ocellated form taken at Rajamundry, Madras, in July, are in Col. Swinhoe's Collection, as also a male of the ocellated form labelled 'Kangra Valley,' which latter locality is very doubtful and probably erroneous—no other example of the species possessing *yellow* glandular patches being known to the author from the N. W. Himalayas. In the Hewitson Collection there is a male of the ocellated form labelled Nilgiris, and there placed as a representative of *Samanta Malsara*. From Ceylon, Major Yerbury has recently sent us examples of both sexes of the ocellated form taken at Trincomli in August, and of the unocellated form taken in October and November, 1890.

Of the illustrations of this species on Plate No. 65, figs. 1, 1a, b, c, represent males and females of the wet-season brood, and figs. 1, d, e, f, g, of the males and female of the dry-season brood.

CALYSISME RAMA.

WET-SEASON BROOD (Plate 57, fig. 3, 3a, ♂).

IMAGO.—*Male*. Upperside olivescens ochreous-brown; marginal lines indistinct. *Forewing* with a distinct transverse medial discal line, and a large prominent median black ocellus with white pupil and narrow ochreous-yellow outer ring, above which is a very minute subapical ocellus between the radials. *Hindwing* with a less distinct small ocellus between the middle and lower median veins; a subbasal tuft of yellow hairs overlapping a small glandular patch of dark brown scales extending below the first branch of the subcostal and surrounded by the ordinary nacreous costal area. Underside pale ochreous-brown, palest externally; marginal lines distinct; with a moderately broad pale ochreous-yellow transverse discal fascia, the inner border of which is sharply defined by a dark brown line, the outer border being diffused. *Forewing* with a small prominent subapical and a large median ocellus; and with a small glandular patch of dull brown scales on middle of the submedian nacreous area. *Hindwing* with seven ocelli, the upper second and third, and the seventh minute and almost obsolete, the other four prominent. Body beneath, legs, and sides of palpi pale ochreous; club of antennæ blackish and tipt with ochreous.

Expanse $1\frac{7}{8}$ inch.

HABITAT.—Ceylon.

A single specimen of the male of this species (presumably of the wet-season brood) taken at Udagama, in the West Central District of Ceylon, by Mr. Reginald Poole, and now in the collection of Mr. E. E. Green, is all that is yet known to the author.

CALYSISME ANDAMANA.

WET-SEASON BROOD (Plate 66, fig. 1, 1a, b, ♂ ♀).

Mycalasis Drusia (part), Moore, P.Z.S. 1877, p. 583.

IMAGO.—*Male*. Upperside. Similar to *C. Nicobarica*, but darker brown. *Forewing* with a somewhat larger median ocellus with a narrow yellow outer ring. *Hindwing* with a minute ocellus between the middle and lower medians. Underside of the same purpurescent-brown, and the transverse pale discal line, as in *C. Nicobarica*. *Forewing* with two similar ocelli, an upper and a lower, the latter somewhat larger. *Hindwing* also with similar ocelli, the upper second and third and the seventh being minute. The glandular patch on underside of the forewing, and that also on the upperside of the hindwing overlapped by the subbasal tuft, are both of them elongate and composed of yellow scales, both patches in *C. Nicobarica* being short and composed of black scales. Female larger. Upperside much darker brown than in this sex of *C. Nicobarica*. *Forewing* with larger median ocellus, and with a more or less developed minute subapical ocellus. *Hindwing* with either one

or two, more or less defined, rather large median ocelli. Underside also darker coloured than in *C. Nicobarica*, the transverse discal pale band and ocelli similar, but the lower ocellus of the forewing somewhat larger; the second and third on the hindwing present but small.

Expanse ♂ $1\frac{2}{3}$, ♀ $2\frac{1}{3}$ inches.

DRY-SEASON BROOD (Plate 66, fig. 1, c, d, ♂).

Male. Larger than the same sex of the ocellated or wet-season brood. Upperside paler, the colour being olivescient ochreous-brown. *Forewing* with a minute subapical ocellus and large lower median ocellus. *Hindwing* with a small ill-defined lower median ocellus. Underside paler olivescient ochreous-brown than the upperside. Both wings with a slender indistinct transverse subbasal line and a distinct discal line, the latter slightly pale bordered. *Forewing* with a subapical and lower median white dot. *Hindwing* with seven minute ocelli, the fifth somewhat the largest and blackest. The glandular patch on both wings elongated and composed of *ochreous yellow scales*. Female. Upperside darker coloured than the male. Underside also darker olivescient-brown, the transverse discal pale band more defined. *Forewing* with two minute upper ocelli and a small lower median black ocellus. *Hindwing* with the ocelli more defined, excepting the second and third, which are obsolescent.

Expanse ♂ 2, ♀ $2\frac{2}{3}$ inches.

HABITAT.—Andamans.

DISTRIBUTION.—Specimens of this species from Port Blair, both of the wet and dry-season broods, received from Mr. F. A. de Roepstorff, are in the author's collection. Others, from Port Mouat, are in the cabinets of the British Museum, and from Port Blair in that of Col. Swinhoe, and the Indian Museum, Calcutta.

INDO-MALAYAN ALLIED SPECIES OF CALYSISME.—*C. Igoleta*, Felder, Wien. Ent. Monats. 1863, p. 127. Semper, Reisen Arch. Philippen, Lep. i. p. 52, pl. 10, fig. 17, 18, ♂ ♀ (1886). *Habitat*. Philippines.—*C. Justinella*, Butler, Catal. Satyr. Brit. Mus. p. 135 (1868). Semper, R. Arch. Phil. Lep. i. p. 51, pl. 10, fig. 15, 16, ♂ ♀ (1886). *Habitat*. Philippines.—*C. sp. nov.* (Mineus *apud* Semper), l. c. p. 51, pl. 10, fig. 11, 12, ♂ ♀. *Habitat*. Philippines.—*C. sp. nov.* (Drusia *apud* Semper), l. c. p. 51, pl. 10, fig. 13, 14, ♂ ♀ (1886). *Habitat*. Mindanao.—*C. Horsfieldii*, Wet-season brood (Plate 66, fig. 2, 2a, b ♂). n. sp. IMAGO. Male. Upperside dark olivescient ochreous-brown; marginal lines paler. Cilia cinereous-brown. *Forewing* with a transverse discal dusky line, and a moderate-sized median black ocellus with white pupil and dull ochreous outer ring. Underside dark olivescient brown, or dark olivescient ochreous-brown. Both wings with a prominent yellowish-white narrow transverse discal band, and pale ochreous-white marginal lines. *Forewing* with a linear series of five prominent moderately-small

ocelli; the second and third smallest, the fourth largest, and all encompassed by a pale violet-white outer line. *Hindwing* with a linear series of seven similar sized prominent ocelli; the second, third, and seventh being the smallest. Female. Upperside. *Forewing* with the median ocellus as in male. *Hindwing* with a distinct very small lower median ocellus. Underside paler olivaceous-brown; transverse discal white band and ocelli as in male, except that the lower small ocellus on the forewing is undeveloped. Male on the underside of the forewing with a glandular patch of dark *ochreous-brown* scales on middle of the submedian vein, these scales being long and narrow, but broadest anteriorly with rounded fronts. On the upperside of the hindwing is the ordinary subbasal tuft of yellow hairs, the tuft only partially overlapping a very prominent and abnormally elongated glandular patch of bright *ochreous-yellow* scales, these scales being somewhat shorter and broader than those on the forewing, the patch itself extending from above the base of the first subcostal and then bending through the interspace between its two branches to nearly half-way towards the outer margin of the wing, and thus being prolonged outwardly much beyond the tuft of hairs, its end terminating straight and erect between the two veins. Expanse, ♂ $1\frac{1}{2}$ to $1\frac{7}{8}$; ♀ $1\frac{7}{8}$ inch.—Dry-season brood (Plate 66, fig. 2, c ♂).—Male. Upperside as in the wet-season brood. Underside darker brown basally, paler and violet-brown externally, the transverse discal band of nearly the same width and as prominently defined; marginal lines less defined. *Forewing* with the five linearly-disposed nearly obsolescent minute ocelli, of which the upper and the fourth are the most developed. *Hindwing* with seven small indistinct ocelli, of which the second and third are minute and nearly obsolete. Expanse ♂ $1\frac{1}{2}$ inch. *Habitat*. Java (Horsfield); Sumatra; Nias. In Coll. F. Moore; British Museum; Hewitson.—*C. Distanti* (Plate 66, fig. 3) n. sp. An allied species, the male possessing on upperside of hindwing a similar elongate *bright yellow patch of scales* prolonged conspicuously beyond the hairy tuft, but is curved on its terminating edge between the veins; the upperside of the wings olivaceous-brown, ocellus similar; underside dark olivaceous-grey, the transverse discal line narrower than in *Horsfieldii* and olivaceous-white, marginal lines also olivaceous-white; *forewing* with only two moderate-sized ocelli, a subapical and a median, each encircled by a pale outer olivaceous-white ring; hindwing with seven ocelli, all encompassed by a similar coloured outer line. Expanse ♂, $1\frac{1}{2}$ inch. *Habitat*. Selangir, Malay Peninsula. In Coll. Swinhoe.

Genus CULAPA.

Culapa, Moore, Proc. Zool. Soc. 1878, p. 825; Trans. Ent. Soc. Lond. 1880, p. 165.

Mycalis (*Culapa*), Marshall and de Nicéville, Butt. of India, etc. i. p. 126 (1883).

IMAGO.—*Forewing* elongate, triangular; costa slightly arched, apex produced and obtusely rounded, exterior margin very oblique and slightly concave; cell long

and narrow; third subcostal branch emitted near the fourth; discocellulars deeply concave; the costal, median, and submedian vein swollen at the base. *Hindwing* somewhat quadrate, apex slightly acute, exterior margin convex hindward and truncated at anal angle, abdominal margin long; cell triangular; discocellulars very oblique and long; middle median branch emitted at some distance before lower end of the cell. *Male* on the upperside of the hindwing with a tuft of fine hairs exerted from base of the cell and overlapping a small glandular patch of scales above the base of first subcostal branch. *Antennæ* with a well-formed slightly stout club. *Palpi* much flattened, compactly clothed with short hairs beneath, apical joint slender, naked, pointed. *Eyes* hairy.

Type.—C. *Mnasicles*.

CULAPA MNASICLES.

(Plate 67, fig. 1, 1a, ♂ ♀).

Mycalasis Mnasicles, Hewitson, Exotic Butt. 111. *Myo.* pl. 5, figs. 32, 33, ♂ (1864). Butler, Catal. Satyridæ Brit. Mus. p. 141 (1868). Druce, Proc. Zool. Soc. 1873, p. 339. Distant, Rhop. Malayana, p. 417, pl. 37, fig. 5 (1886).

Culapa Mnasicles, Moore, Proc. Zool. Soc. 1878, p. 825; Trans. Ent. Soc. Lond. 1880, p. 126.

Mycalasis (Culapa) Mnasicles, Marshall and de Nicéville, Butt. of India, etc. i. p. 126, pl. 16, fig. 51, ♀ (1883).

IMAGO.—Male and female. Upperside deep ochreous-brown, brightest about the discal area. *Forewing* with a minute subapical and a very large prominent median ocellus, each black with white pupil and ochreous outer ring; in some specimens the subapical ocellus is absent. *Hindwing* with a very small ill-defined lower median ocellus, and a very indistinct submarginal dusky lunular line. Underside pale brownish-ochreous in male, female more cinereous-brown externally. Both wings with a transverse subbasal and a discal distinct dark ochreous-brown slightly irregular line, a small lunular dot on middle of the discocellulars, a submarginal indistinct lunular line, distinct marginal lines, and a dusky outer discal shade. *Forewing* with a series of five very minute ocelli, the upper second generally rudimentary and the lowest composed of a larger whitish spot only. *Hindwing* with a series of seven very minute ocelli. *Male* on the upperside of the hindwing with a tuft of fine hairs exerted from base of the cell and overlapping a small glandular patch of scales above base of the first subcostal branch. *Body* beneath, palpi, and legs pale ochreous-brown. *Antennæ* brighter ochreous beneath and at the tip, the club with a blackish band.

Expanse $2\frac{1}{2}$ to 3 inches.

HABITAT.—Upper Burma, Tenasserim; Malayaia.

DISTRIBUTION.—According to Major C. H. E. Adamson (List of Burmese Butterflies, 1889, p. 7), "this insect was plentiful near Paphoon on the Salween, Burma, in November, 1878. It occurs also in Tavoy, and Bhamo." Examples

have been obtained in Moulmein. Mr. O. Limborg (P. Z. S. 1878, 825) obtained it in Upper Tenasserim at "Ahsown 2000 feet and at Meetan 3000 feet, in April." Captain C. T. Bingham (Butt. Ind. i. 126) "took a single female in April in the Thoungyeen forests." A male from Tavoy is recorded by Mr. J. H. Elwes (J. A. S. Bengal, 1887, 418).

DISTRIBUTION OUTSIDE INDIAN AREA.—In the Malay Peninsula, Mr. Distant (Rhop. Malay. p. 417) records its capture at Perak. It also occurs in Sumatra and Borneo.

Genus PACHAMA.

Pachama, Moore, Trans. Ent. Soc. Lond. 1880, p. 165.

Mycalesis (*Pachama*), Marshall and de Nicéville, Butt. of India, etc. i. p. 124 (1883).

IMAGO.—Wings large and broad, but comparatively shorter than in *Samanta*. *Forewing* with the costa much arched in the middle, apex rounded; exterior margin slightly oblique and convex; the costal, median, and submedian vein swollen at the base. *Hindwing* somewhat bluntly conical; anterior margin slightly arched; apex slightly angled, exterior margin very oblique and scarcely convex; first subcostal branch emitted at some distance before end of the cell; the cell long, much pointed at the end; discocellulars very oblique and wavy; radial from a slight angle near the subcostal. Cilia prominent. *Male* on upperside of the hindwing with a slight subbasal tuft of fine hairs overlapping a glandular patch of scales. *Palpi* slender, tip long and pointed. *Eyes* hairy. *Antennæ* with a gradually formed club.

Type.—P. *Mestra*.

PACHAMA MESTRA.

(Plate 67, fig. 2, 2a, ♂).

Mycalesis Mestra, Hewitson, Exotic Butt. iii. p. 79. *Myc.* pl. 1, fig. 2 (1862). Butler, Catal. Satyr. Brit. Mus. p. 137 (1868).

Pachama Mestra, Moore, Trans. Ent. Soc. Lond. 1880, p. 165.

Mycalesis (*Pachama*) *Mestra*, Marshall and de Nicéville, Butt. of India, etc. i. p. 124 (1883).

IMAGO.—Male and female. Upperside dark olivescient ochreous-brown. Cilia white. *Forewing* with a transverse discal narrow ochreous-white band, a small subapical ocellus and a moderate-sized one between the middle and lower medians, each with a white pupil and narrow ochreous outer ring; marginal lines pale and wavy. *Hindwing* with the transverse pale discal band of the underside indistinctly visible; a prominent moderate-sized median ocellus, and two marginal ochreous-white lines, the outer one most prominent. Underside dark olivescient ochreous-brown, the basal area undulated with pale ochreous and brown strigæ; the transverse discal band broad, prominent, pale ochreous-yellow; exterior marginal lines also ochreous-yellow. *Forewing* with two, sometimes three, small prominent apical ocelli, the median ocellus as

above but prominent. *Hindwing* with three prominent apical small decreasing ocelli, and two larger anal ocelli, all deep black with white pupil and slender bright ochreous outer ring, the anal one being bipupilled. *Male* on upperside of the hindwing with a slight subbasal tuft of fine hairs overlapping a *glandular patch of scales*. Legs, streaks on side of palpi, and antennæ pale ochreous, band on club blackish.

Expanse, $2\frac{2}{3}$ to $2\frac{4}{5}$ inches.

HABITAT.—Bhutan; Assam; Khasia Hills.

DISTRIBUTION.—Mr. L. de Nicéville (J. A. S. Beng. 1887, 350) records this species from Bhutan, Assam, and the Khasia Hills. Both sexes were taken in the Khasias by Col. Godwin-Austen.

PACHAMA SUAVEOLENS (Plate 67, fig. 3, 3a, b, ♂ ♀).

Mycalesis (*Pachama*) *Suaveolens*, Wood-Mason and de Nicéville, Butt. of India, etc. i. p. 125 (1883),

♂; *id.* Journ. Asiatic Soc. Bengal, 1887, p. 349, pl. xvi. fig. 1, ♂.

Mycalesis Nicotia, Elwes, Trans. Ent. Soc. Lond. 1888, p. 306, pl. ix. fig. 5, ♀.

IMAGO.—Male and female. Upperside dark olivescient ochreous-brown, the transverse discal pale line very indistinct; marginal lines pale brownish-ochreous, palest on the hindwing. Cilia cinereous-white, prominent. *Forewing* with two subapical black ocelli, each with white pupil and narrow ochreous outer ring, the upper one always minute and the lower moderately large, the median ocellus large. *Hindwing* with a moderately-large lower median ocellus, and sometimes in both sexes a minute ocellus is present between the middle and upper medians, and in others there is also a very minutely indicated ocellus between the upper median and the radial. Underside darker olivescient-brown, not striated, but the hindwing basally is thickly studded with olivescient-ochreous scales; transverse discal band prominent, about half the width of that in *P. Mestra*, and on the forewing it is slightly excurved and its border less regular; marginal lines pale olivescient-ochreous. *Forewing* with two moderate-sized prominent subapical ocelli, each with white pupil and narrow ochreous ring, above the upper is an extremely minute attached ocellule between the end of subcostals, and below the second a minute fourth attached ocellule is present between the lower radial and upper median; below these there is a large prominent ocellus between the middle and lower medians and a minute less developed ocellule between the middle and upper medians, each series being separately encompassed by a pale olivescient-ochreous outer ring. *Hindwing* with seven prominent ocelli, of which the four upper are small but of nearly equal size, the fifth the largest, the other two decreasing in size, each one encircled by a pale olivescient-ochreous speckled outer ring. *Male* with a subbasal tuft of ochreous hairs overlapping a *glandular patch of ochreous*

scales. Abdomen and legs beneath and streaks on sides of palpi pale olivescens-ochreous. *Antennae* brown above, annulated with brown and pale ochreous on basal half beneath, the anterior half and tip bright ochreous with black band on the club.

Expanse, ♂ $2\frac{1}{4}$ to $2\frac{1}{2}$, ♀ $2\frac{3}{8}$ to $2\frac{1}{2}$ inches.

HABITAT.—Cachar, Sikkim.

DISTRIBUTION.—“A single male was taken on Nemotha, North Cachar, at an elevation of 3300 feet, in September; Mr. Wood-Mason noting that the scent-glands and fans, which are much as in *M. Malsara*, emitted a powerful and delicious odour resembling that of vanilla for some hours after the death of the insect.” (Mr. de Nicéville, Butt. Ind. i. 125.) “Occurs very locally in Sikkim; Mr. Otto Möller has taken it in April and May only in one place at about 3000 feet, below Tukvar.” (Elwes, Tr. Ent. Soc. 1888, 306.)

Genus SAMANTA.

Samanta, Moore, Trans. Ent. Soc. Lond. 1880, p. 166.

Mycalesis (*Samanta*), Marshall and de Nicéville, Butt. of India, etc. i. p. 129 (1883).

IMAGO.—Forewing triangular, arched towards the end, apex convex; costal, median, and submedian vein swollen at the base. Hindwing conical, exterior margin somewhat scalloped; first and second subcostal branches emitted before end of the cell, base of the first straight; discocellulars straight, upper inwardly oblique, lower very slightly outwardly oblique; cell short. *Male* on upperside of hindwing with a small tuft of brownish hairs overlapping a *glandular patch of scales* above the base of subcostal branch; and on the underside of the forewing with a very small *glandular patch of dark brown scales* above middle submedian vein.

Type.—*S. Malsara*.

SAMANTA MALSARA.

WET-SEASON BROOD (Plate 68, fig. 1, 1a, b, ♂ ♀).

Mycalesis Malsara, Moore, Catal. Lep. Mus. E. I. Company, i. p. 231 (1857). Hewitson, Exotic Butt. 111, p. 80, *Myc.* pl. i. fig. 5, 6 (1862). Butler, Catal. Satyr. Brit. Mus. p. 138 (1868).

Samanta Malsara, Moore, Trans. Ent. Soc. Lond. 1880, p. 166.

Mycalesis (*Samanta*) *Malsara*, Marshall and de Nicéville, Butt. of India, etc. i. p. 129 (1883).

IMAGO.—Upperside dark olivescens-ochreous-brown; marginal lines pale ochreous-brown. Cilia cinereous-ochreous. *Forewing* with a transverse discal broad pale ochreous-yellow band, a small subapical and a larger median blind ocellus, and a minute ocellus sometimes above and contiguous to the latter. *Hindwing* with the transverse discal broad band of the underside slightly apparent, and two small median blind ocelli. Underside paler brown; basal area with numerous darker brown strigæ; with a prominent transverse discal broad pale yellowish band on both wings. *Forewing* with five prominent ocelli, of which the upper first and third

are minute, all encompassed by a pale purple-grey outer line. *Hindwing* with seven prominent ocelli, the third, fourth, and seventh the smallest, all encompassed by a single pale purple-grey outer line. *Male* on upperside of the hindwing with a small tuft of brownish hairs overlapping a *glandular patch of scales* above the base of subcostal branch; and on the underside of the forewing with a very small *glandular patch of dark brown scales* above middle of the submedian vein.

Expanse, ♂ $1\frac{3}{4}$, ♀ $2\frac{1}{4}$ inches.

DRY-SEASON BROOD (Plate 68, fig. 1, c, ♂).

Samanta rudis, Moore, Trans. Ent. Soc. Lond. 1880, p. 166, ♂.

Mycalesis (Samanta) rudis, Marshall and de Nicéville, Butt. of India, etc. i. p. 130 (1883).

IMAGO.—Upperside similar to the wet-season brood; with the transverse pale ochreous band on the forewing narrower; ocelli similar. Underside, various shades of dark ochreous-brown basally, violet-grey externally, or of violet-brown, and grey externally, with numerous darker brown strigæ; both wings with a prominent ochreous-yellow transverse discal broad band, the inner border of which is sharply defined and the outer diffused; a submarginal series of minute indistinct white-pupilled ocelli, the two or three subanal being generally more developed; an indistinct ochreous-speckled pale streak crossing middle of the cell on both wings. *Male* with the tuft and glandular patch as in the wet-season brood.

Expanse, $1\frac{9}{16}$, to 2 inches.

HABITAT.—Sikkim; Khasia, Naga, and Karen Hills; Sibsagar; Cherra Punji; Burma.

VARIATION.—A male of the [?] wet-season brood, from Cherra Punji, Assam, in the Hewitson Collection (from the late W. S. Atkinson), differs from typical specimens above in being of a more ochreous colour, the transverse band but very slightly perceptible and very narrow, being two-thirds less in width. Forewing with small subapical and two larger median blind ocelli. Hindwing with two ill-defined median blind ocelli. Underside also much paler than in typical specimens and of a decided ochreous tint, the transverse discal band only half the ordinary width, more ochreous in tint, and is situated somewhat further from the outer margin; the ocelli on the forewing are similar, but more straight in linear series, and with a small additional lower one; the ocelli also have paler ochreous rings, and the whole series are further from the outer margin; hindwing with seven similar ocelli, which are more curved in their position across the wing, and have paler ochreous outer rings. A similar specimen from Sibsagar is mentioned (Butt. Ind. i. 129) by Mr. de Nicéville.

Expanse, $1\frac{1}{8}$ inch.

DISTRIBUTION.—In Sikkim, Mr. de Nicéville (J. A. S. Beng. 1881, 150) records the wet-season brood as "common in October, settling on the road in damp places; and (*id.* 1882, 56) not uncommon amongst bushes and undergrowth." Mr. Elwes

(Tr. Ent. Soc. Lond. 1888, 306) says it is "a common species in Sikkim from the Terai up to 3000 feet; it occurs from March to November in the form of *Malsara*, but the form known as *rudis*, which Messrs. Müller and Knyvett both think is the cold-weather brood, is only taken in February, March and April." An example of the wet-season brood labelled "Bhotan" is in the British Museum. Mr. de Nicéville (Butt. Ind. i. 129) records the wet-season form (*malsara*) from the Khasia Hills, Sibsagar, and Cherra Punji; and the dry-season form (*rudis*) from the Naga Hills, and from the hills east of Manipur in May, taken by Mr. A. O. Hume. The dry-season form also occurs in the Karen Hills in March. In Burma, Mr. Doherty (J. A. S. Beng. 1886, 115) says, "I have taken the dry-season form (*rudis*) abundantly in the Chittagong Hill tracts." Major H. E. Adamson (in his notes) records the ocellated form as being "common during the rainy season at Bhamo, but males only having been taken; the unocellated form not common in March." Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 517) states that it is "a common insect in the Shan States." Captain Bingham obtained the dry-season form in the Donat range in Upper Tenasserim in January, and in the Upper Thoungyeen forests in April (Butt. Ind. i. 130). In Orissa, Mr. W. C. Taylor (List of Orissa Butterflies, p. 2) records the dry-season form from Khurda, in March.

SAMANTA LEPCHA.

WET-SEASON BROOD (Plate 68, fig. 2, 2a, ♂).

IMAGO.—Male. Upperside of the same colour as *S. Malsara*; both wings with a scarcely-perceptible extremely narrow transverse discal pale line. *Forewing* with an indistinct minute subapical and a larger median blind ocellus. *Hindwing* with two minute very indistinct lower median blind ocelli. Underside coloured, and with the ocelli, as in *C. Malsara*; the transverse discal band extremely narrow, yellow; male with similar tuft on hindwing.

Expanse, $1\frac{7}{8}$ inch.

DRY-SEASON BROOD (Plate 68, fig. 2, b, ♀).

Samanta Lepcha, Moore, Trans. Ent. Soc. Lond. 1880, p. 167, ♂.

Mycalesis (Samanta) Lepcha, Marshall and de Nicéville, Butt. of India, etc. i. p. 130 (1883).

IMAGO.—Male and female. Upperside dark brown; with a very indistinct pale transverse discal extremely narrow line. *Forewing* with two, or sometimes three, submarginal blind ocelli, smaller than those in *C. Malsara*, the upper two being minute. *Hindwing* with one, or two, minute similar subanal ocelli. Underside darker and brighter coloured, more violet in tint, greyish externally, covered with numerous darker brown strigæ; both wings with a prominent but extremely narrow ochreous-yellow transverse discal band, and a submarginal series of indistinct minute black spots with white pupils; a pale speckled indistinct streak crossing both cells. Male with similar tuft on hindwing.

Expanse, 2 to 2½ inches.

HABITAT.—N.-W. Himalayas ; Nepal.

Distinguishable from typical *S. Malsara* by its narrower transverse discal band on the upper and underside in both the wet and dry-season brood, and distinctly smaller blind ocelli.

DISTRIBUTION.—Confined to the N.-W. Himalayas and Nepal Valley. Obtained by the late Major-Gen. G. Ramsay during his residency at Kathmandu. Col. A. M. Lang obtained it at Masuri in May. It has also been taken in Kangra. In Kumaon, Mr. W. Doherty took the wet-season form in the Kali, Gori, and Sarju Valleys, 2000 to 4000 feet, in August and September. The dry-season form (*lepcha*) taken in the Lower Kali Valley, 3000 feet, in November, rare. (Journ. As. Soc. Bengal, 1886, p. 115).

SAMANTA BETHAMI.

DRY-SEASON BROOD (Plate 68, fig. 4, ♂).

IMAGO.—Male. Upperside olivescient ochreous-brown, with the narrow pale transverse discal band of the underside plainly visible; marginal lines slightly paler. *Forewing* with a minute subapical and a small lower median ill-defined blind ocellus. *Hindwing* with two very small median blind ocelli. Underside dark cinereous purpurescent-brown basally, pale purpurescent greyish-brown externally, with numerous slightly darker slender strigæ; transverse discal fascia pale ochreous-white and sharply defined internally but diffused externally. *Forewing* with minute white-pupilled black spots. *Hindwing* with seven similar minute spots, the upper third almost obsolete; marginal lines slender, indistinct. A small *glandular patch of black scales* on underside of the forewing on the submedian vein, and a *similar patch* on upperside of the hindwing overlapped by the subbasal tuft of dusky-brown hairs.

Expanse, ♂ 1¾ inch.

HABITAT.—Pachmarhi, Central India.

DISTRIBUTION.—A single male of this butterfly taken by Mr. J. A. Betham at Pachmarhi, 3500 feet, a sanitarium in the Salpura Hills, Central Provinces, in June, 1886, now in Colonel C. Swinhoe's collection, is all that is at present known to us. It is undoubtedly a specimen of a dry-season form, and a *Samanta*, but no specimens of its ocellated or wet-season form have come under our examination. The only other known allied species of the genus is that from the Anaymalai Hills, in the extreme south of India, described on next page. In his "Notes on the Butterflies of the Central Provinces" (Journ. Bombay Nat. Hist. Soc. 1890, 157) Mr. Betham probably refers to this species, under the name *M. Malsara*, wherein he says, "This is the rains form of *rudis*; I have taken but few specimens of these two forms, in fact I do not think I have yet taken *Malsara*. It is also a darker insect, but the underside has a redder tinge than the others."

SAMANTA DAVISONI (Plate 68, fig. 3, ♂).

IMAGO.—Male. Upperside dark olivescient ochreous-brown, Both wings with a faint trace of the discal transverse band of the underside seen from above; cilia whitish and distinctly alternated with black at end of the veins. *Forewing* with a small black spot between the middle and lower median veins. *Hindwing* with two small black spots, of which the upper one is between the upper and middle medians and the other between the middle and lower medians; submarginal lunular lines pale, indistinct, the intervening line and the extreme marginal line of both wings being blackish. Underside darker, purpurescent in tint; basal area with numerous indistinct black strigæ. Both wings with a prominent sharply-defined white transverse discal band, the outer edge of which is blackish; marginal lunular lines ochreous. *Forewing* with six ocelli on a purple-brown ground-colour, of which the four upper are minute and the third and fourth incomplete; the fifth (between the middle and lower median) moderately large, the sixth minute, and the whole encompassed by the ordinary pale violet-grey line. *Hindwing* with seven ocelli, on a purple-brown ground-colour, of which the three middle ones are somewhat pointed externally, and the third, fourth, and seventh the smallest. *Male* with a small *patch of black scales* on underside of the forewing, and a *similar patch* on the upperside of hindwing overlapped by a subbasal tuft of brown hairs. *Body* dark brown; palpi and legs paler; edges of palpi ochreous. Antennæ bright ochreous towards the end, with the tip black.

Expanse, ♂ $1\frac{3}{4}$ inch.

HABITAT.—Anaymalai Hills, S. India.

DISTRIBUTION.—A single male of this species, here described and figured, was taken by Mr. Davison on the Anaymalai Hills, south of the Palghat Gap, at 3000 to 4000 feet elevation, and is now in the collection of Mr. F. D. Godman.

SAMANTA NICOTIA.

WET-SEASON BROOD (Plate 69, figs. 1, 1a, b, c, ♂ ♀).

Mycalesis Nicotia, Doubleday and Hewitson, Genera of D. Lep. p. 394, pl. 66, fig. 4, ♀ (1851).
Hewitson, Exot. Butt. iii. *Myc.* pl. 1. fig. 1, ♂ (1862). Butler, Catal. Satyr. Brit. Mus. p. 139 (1868).

Samanta Nicotia, Moore, Trans. Ent. Soc. Lond. 1880, p. 167.

Mycalesis (Samanta) Nicotia, Marshall and de Nicéville, Butt. of India, etc. i. p. 129 (1883).

IMAGO.—Male and female. Upperside dark olivescient ochreous-brown, exterior marginal lines and cilia pale ochreous. *Forewing* with a moderate-sized subapical ocellus having a very minute lower ocellule attached to it, and a very large lower median black ocellus, both ringed with pale ochreous; transverse discal line of the underside very slightly perceptible above. *Hindwing* with a moderate-sized ocellus

between the middle and lower medians. Underside: both wings with the basal area pale ochreous-brown, numerous covered with short dark brown strigæ; crossed by a prominent discal yellow brown-bordered band, the exterior margins of the wings being pale violet-brown, and the extreme marginal lines pale ochreous-brown edged with black. *Forewing* with a linear row of five prominent ocelli, the upper four being very small, the lowest large and situated between the middle and lower median veins. *Hindwing* with seven prominent ocelli, the upper second, third fourth, sixth, and seventh small. *Male* on the upperside of the hindwing with a subbasal tuft of black hairs overlapping the *glandular patch composed of jet black scales*. Body and legs beneath, pale ochreous-brown; sides of palpi streaked with ochreous.

Expanse, ♂ $2\frac{2}{3}$, ♀ $2\frac{1}{3}$ inches.

DRY-SEASON BROOD (Plate 69, fig 1, d, e, f, ♂ ♀).

Mycalesis (Samanta) Langii, de Nicéville, Butt. of India, etc. i. p. 130 (1883); *id.* Trans. Ent. Soc. Lond. 1884, p. 88, pl. 3, fig. 3, ♂.

IMAGO.—Male and female. Upperside. *Forewing* as in wet-season brood. *Hindwing* in the male sometimes with a minute anal ocellule beneath the lower median ocellus, and two, or three, upper minute ocelli above it; the female sometimes also with a minute anal ocellus. Underside pale olivescens-ochreous, the basal area darkest and numerous covered with dark brown strigæ; the transverse discal band narrower and paler; the ocelli minute, those anteriorly generally absent, or indicated by pale dots. *Male* with the subbasal tuft of black hairs overlapping the *glandular patch of jet black scales*.

Expanse, ♂ $2\frac{1}{3}$ to $2\frac{2}{3}$, ♀ $2\frac{1}{3}$ inches.

HABITAT.—N.-W. and E. Himalayas; Khasia, Naga, and Karen Hills.

DISTRIBUTION.—From the N.-W. Himalayas examples of the dry-season form have been obtained at Masuri in April and May, by Colonel A. M. Lang. In Sikkim the dry-season form was obtained in March, and "the wet-season form in August" (de Nicéville, Butt. Ind. i. 129). The dry-season form is also recorded (Butt. Ind. i. 130) from the Khasia and Naga Hills. A male of the dry-season form, from the Karen Hills, Burma, obtained by Mr. Cowen, is in Mr. F. D. Godman's Collection.

Of the illustrations of this species on our Plate 69, figs. 1, 1a, represent a male of the wet-season form, from Sikkim, in the collection of Mr. P. Crowley; figs. 1b, c, that of a female of the same form, in my own collection; figs. 1d, e, represent the male of the dry-season form, from Sikkim, also in my own collection; and fig. 1f, that of a female of the latter form, from Masuri, kindly lent by Mr. L. de Nicéville.

SAMANTA MISENUS (Plate 70, fig. 1, 1a, b, ♂ ♀).

Mycalesis (Samanta) Misenus, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1889, p. 164, pl. A, fig. 8, ♂.

IMAGO.—Male and female. Upperside. Both wings somewhat darker than in *S. Nicotia*. *Forewing* with either one, or two, sometimes three, subapical ocelli in the male, and two in the female; the upper and lower when present in the male being very minute; the median ocellus invariably smaller than in *S. Nicotia*. *Hindwing* with a similar median ocellus. Underside. Both wings with the basal area pale cinerous-brown, the short strigæ much darker brown and more densely disposed, the transverse discal band is much paler yellow and slightly narrower, the exterior margins of both wings pale cinerous-ochreous, traversed by the marginal lines; ocelli on both wings similar and of the same number as in *S. Nicotia*. *Male* with the subbasal tuft composed of *ochreous* hairs (these tufts being black in *Nicotia*), and the glandular patch also composed of ochreous scales.

Expanse, ♂ $2\frac{2}{3}$, ♀ $2\frac{3}{8}$ inches.

HABITAT.—Sikkim; Khasias.

Mr. L. de Nicéville remarks (Journ. Bombay N. H. S. 1889, 164) that “Mr. Otto Möller and I independently discriminated this species as distinct from *Nicotia* by the conspicuously darker ground-colour of the underside; it was only afterwards that the marked difference between the two species in the colour of the hairs of the ‘scent-fan’ was noticed. It appears probable that this species only occurs in the ocellated form, as is the case in *M. Heri*, and *M. Suaveolens*.”

DISTRIBUTION.—According to Mr. L. de Nicéville (l. c. p. 164), “males and females were obtained in Sikkim from April 1st to May 1st, *i.e.* in the dry season; and males and females from the Khasia Hills have been obtained by the Rev. W. A. Hamilton.”

The illustrations of this species on our Plate 70, figs. 1, 1a, b, represent the male and female from specimens taken in Sikkim by Mr. O. Möller, and now in the collection of Mr. J. H. Leech.

SAMANTA HERI (Plate 70, fig. 2, 2a, b, ♂ ♀).

Mycalesis Heri, Moore, Catal. Lep. Mus. E. I. Compy. i. p. 233 (1857), ♂. Butler, Catal. Satyr. Brit. Mus. p. 134 (1868).

Samanta Heri, Moore, Trans. Ent. Soc. Lond. 1880, p. 167.

Mycalesis (Samanta) Heri, Marshall and de Nicéville, Butt. of India, etc. i. p. 128 (1883).

IMAGO.—Male. Upperside bright olivaceous ochreous-brown; marginal lines and cilia pale ochreous-brown. *Forewing* with a large prominent subapical ocellus, and a very large lower median ocellus, black with ochreous outer ring and white pupil. *Hindwing* with three moderately-large discal ocelli, the upper one smallest; sometimes there is a fourth lower minute ocellule, in the male, between the median

and submedian veins. Underside. Both wings with the basal area pale ochreous-brown (paler than in *S. Nicotia*) and with numerous uniformly distributed dark brown strigæ; transverse discal line, narrow, ochreous-yellow; outer margin of wings pale violet ochreous-brown; marginal lines ochreous. *Forewing* with ocelli as on the upperside but somewhat smaller, the subapical ocellus generally having a minute ocellule attached above and below it (as in the male *type*), and the large median ocellus sometimes with a minute ocellule attached above it. *Hindwing* with seven ocelli, somewhat larger than in *S. Nicotia*. Female. Upperside paler than in male. *Forewing* with the ocelli somewhat smaller. *Hindwing* with two median ocelli. Underside paler than in male; marked the same. *Male* on the hindwing above with a prominent *subbasal tuft of ochreous hairs* overlapping a *glandular patch of black scales*.

Expanse, ♂ $2\frac{1}{4}$ to $2\frac{1}{2}$, ♀ $2\frac{1}{2}$ inches.

HABITAT.—N.-W. and E. Himalayas.

DISTRIBUTION.—The type specimen, now in the British Museum, was recorded from the Eastern Himalayas. Mr. de Nicéville (Butt. Ind. i. 128) records it from Bhutan. It has been taken at Naini Tal, 4200 feet, in September. Mr. W. Doherty, in his notes on the butterflies taken by him in Kumaon, says (J. A. S. Beng. 1886, 115): "My two specimens from Kapkot and Baghrihat, taken at 5000 feet, differ from a Sikkim specimen in Indian Museum, Calcutta, in having the band below almost obsolete. One has only two ocelli on the forewing below; the other has two additional smaller ones between them. Both have only two ocelli on the hindwing above. I have also the dry-season form, one male taken at Jhulaghat, 2000 feet, lacking the ocelli below, but otherwise similar, especially in the prehensores."

The illustrations of this species on our Plate 70, figs. 2, 2a, represent the male from a Bhutan specimen, and fig. 2b, that of a female from Naini Tal, kindly lent by Mr. L. de Nicéville.

Genus TELINGA.

Telinga, Moore, Trans. Ent. Soc. Lond. 1880, p. 167.

Mycalopsis (*Telinga*), Marshall and de Nicéville, Butt. of India, etc. i. p. 123 (1883).

IMAGO.—Forewing comparatively long and narrow, apex slightly convex; exterior margin oblique, nearly straight, posterior margin convex near the base; cell long; base of the costal, median, and submedian vein swollen. Hindwing broad, somewhat quadrate; costa arched at the base and thence straight to apex; exterior margin waved, convexly angular in the middle, anal angle convex; cell broad, triangular; discocellulars very long and oblique; second subcostal branch emitted just before end of the cell; upper and middle median branches from lower

end of the cell. Male with a small *subcostal tuft* overlapping a *glandular patch* of scales on the upperside of hindwing, and on the underside of forewing is a nacreous patch of modified scales covering the basal area of the posterior margin, but is not accompanied by the ordinary glandular patch of dark scales. *Palpi* stout at the tip. *Eyes* hairy. *Antennæ* with the club well formed.

Type, T. Adolpheï.

TELINGA ADOLPHEI (Plate 71, fig. 1, 1a, b, c, ♂ ♀).

Satyris Adolpheï, Guérin, in Delessert's *Souv. Voy. l'Inde*, pt. ii. p. 76 (1843).

Mycalesis Adolpheï, Westwood and Hewitson, *Gen. D. Lep.* p. 394 (1851); Butler, *Catal. Satyr. Brit. Mus.* p. 139 (1868).

Telinga Adolpheï, Moore, *Trans. Ent. Soc. Lond.* 1880, p. 168.

Mycalesis (Telinga) Adolpheï, Marshall and de Nicéville, *Butt. of India*, etc. i. p. 123 (1883).

Mycalesis Onatas, Hewitson, *Exotic Butt.* iii. p. 90, *Myc.* pl. 6, fig. 40 (1864) ♂.

IMAGO.—Male. Upperside dark rufescent-brown, brightest and darkest anteriorly; the hindwings palest. Cilia cinereous-brown. *Forewing* with a distinct black-bordered white subapical dot, and a moderately-large prominent black ocellus with rufous outer ring between the lower medians. *Hindwing* with either two, three, and sometimes four small medial discal rufous-ringed black ocelli. Underside paler, the outer borders more ochraceous, numerously undulated with darker brown strigæ, and hindwing more or less thickly irrorated with ochreous scales. Both wings with a dark brown transverse discal line. *Forewing* with a small subapical more or less complete ocellus and a somewhat larger lower median ocellus; sometimes there is a distinct white dot below the subapical ocellus. *Hindwing* with six more or less developed small prominent ocelli, of which the four upper and the lowest are minute. Male with a *subbasal tuft* of dark brown hairs overlapping a small *glandular patch* of black scales on the upperside of hindwing, and on the underside of the forewing with a large nacreous area at base of the submedian, but with no visible accompanying ordinary glandular patch of dark scales. Female larger than male. Upperside of the same colour. *Forewing* with the median ocellus larger. *Hindwing* with three medial discal small ocelli, as in male. Underside much paler than in male, being pale ochreous-brown, the basal area and exterior borders undulated with brown strigæ, the transverse discal brown line outwardly diffused with lilacine-grey. *Forewing* with a subapical white spot, or small imperfect ocellus, and a similar-sized small lower median well-developed ocellus. *Hindwing* with six small ocelli of the same size as on underside of the male. *Body* above dark brown, paler beneath; streaks on sides of palpi, and the legs cinereous-ochreous.

Expanse, ♂ 2 to $2\frac{1}{8}$, ♀ $2\frac{2}{8}$ to $2\frac{3}{8}$ inches.

HABITAT.—South India.

DISTRIBUTION.—Mr. G. F. Hampson (J. A. S. Beng. 1888, 348) obtained it on “the Nilgiris, from 5000 to 6000 feet, where it is confined to the forest on the edges of the plateau.” Examples have also been taken at Mettapalayam in Coimbatore.

HABITS.—According to Mr. Hampson (l. c. 348), “It has only the two wet-season broods; in May and August.”

The illustrations of this species on our Plate 71, figs. 1, 1a, b, c, represent the male and female from the Nilgiris.

TELINGA OCLUS (Plate 71, figs. 2, 2a, b, c, ♂ ♀).

Mycalesis oculus, Marshall, Journ. Asiatic Soc. Bengal, 1880, p. 247.

Mycalesis (Telinga) oculus, Marshall and de Nicéville, Butt. of India, etc. i. p. 124, pl. xvi fig. 53, ♀ (1883).

IMAGO.—Male. Upperside rich ferruginous-brown. *Forewing* darker brown externally; with an indistinct small subapical black spot with white pupil; a very large prominent lower black ocellus, with large white pupil, broadly surrounded externally with bright ferruginous-red, which latter colour forms an irregular discal patch extending from the posterior margin and is anteriorly prolonged in front of the subapical spot to near the costa. *Hindwing* with four anteriorly decreasing moderately small black ocelli with white pupils and darker ferruginous-red outer rings. Cilia dark cinereous. Underside paler ferruginous-brown, more ochraceous brown externally. Both wings with the basal area marked with short dark ferruginous-brown strigæ, and with a distinct darker brown transverse discal line, which is widely ochreous bordered externally at its costal end on the forewing, and narrowly with cinereous posteriorly on both wings. *Forewing* with a minute subapical and a small lower median ocellus, and sometimes a white dot is also present between the upper and middle median veins. *Hindwing* with six very small ocelli, the four upper and the lowest being minute.

Male with a *subbasal tuft of brown hairs* overlapping a small *glandular patch of black scales* on the upperside of hindwing, and on the underside of the forewing with a large basal nacreous area with a very slight ordinary glandular patch of blackish scales.

Female larger. Upperside of somewhat brighter colours; all the ocelli larger and more prominent. Underside paler than in the male, the transverse discal line on both wings broadly diffused externally with paler ochreous anteriorly and cinereous posteriorly; ocelli the same as in male.

Body above dark brown; abdomen beneath, legs, and streaks on sides of palpi pale ochreous-brown.

Expanse, ♂ $2\frac{1}{2}$ to $2\frac{2}{3}$, ♀ $2\frac{3}{4}$ to $2\frac{4}{5}$ inches.

HABITAT.—South India.

DISTRIBUTION.—“Occurs only in the extreme south of the Peninsula. It was taken in the Ashambo Hills in Travancore, in May, and at Eridge, Trevandrum, in May, by Mr. H. Fergusson” (Butt. Ind. i. 124). Also taken in Travancore, in April, at 4100 feet elevation. According to Mr. G. F. Hampson (J. A. S. Beng. 1888, 348) “it is found on the Anaymalai Hills, south of the Palghat Gap.” There are two males from the latter locality taken by Mr. Davison, from 3000 to 4000 feet elevation, in Mr. F. D. Godman’s collection; these males are both smaller than those described above, being less than two inches in expanse, and have only three small less prominent ocelli on the hindwing above, and on the underside the apical external border to the transverse discal band is dark reddish-ferruginous instead of yellow.

The illustrations on our Plate 71, fig. 2, 2a, b, c, represent the male and female from Travancore specimens.

Genus KABANDA.

Kabanda, Moore, Trans. Ent. Soc. Lond. 1880, p. 168.

Mycalesis (*Kabanda*), Marshall and de Nicéville, Butt. of India, etc. i. p. 127 (1883).

IMAGO.—Wings short, broad. *Forewing* very much arched from the base, apex and exterior margin slightly convex and even; base of the costal, median, and submedian vein swollen; cell short and broad. *Hindwing* bluntly conical, short; exterior margin almost even, anal angle very convex; costal vein quite short and nearly straight; first subcostal branch emitted immediately before end of the cell; disco-cellulars almost erect; cell very short; middle median branch emitted before lower end of the cell. *Male* with a *slight subcostal tuft* and *glandular patch of scales* on upperside of the hindwing, and also with the median branches dilated and grooved at the base, the lower *basal area of this wing being hairy*; on the underside of the forewing is a small ordinary glandular patch above the submedian vein.

Type.—K. Malsarida.

KABANDA MALSARIDA.

WET-SEASON BROOD (Plate 72, fig. 1, 1a, ♂).

Mycalesis Malsarida, Butler, Catal. Satyridæ Brit. Mus. p. 134, pl. 3, fig. 14 (1868).

Kabanda Malsarida, Moore, Trans. Ent. Soc. Lond. 1880, p. 168.

Mycalesis (*Kabanda*) *Malsarida*, Marshall and de Nicéville, Butt. of India, etc. i. p. 127 (1883); de Nicéville, J. A. S. Bengal, 1888, p. 273.

IMAGO.—Male. Upperside dark umber-brown. *Forewing* slightly paler at the apex; marginal lines also paler. Cilia cinereous-brown. *Hindwing* hairy on the lower basal area, partially covering the dilated bases of the median veinlets, and with a subbasal

tuft of hairs overlapping a small glandular patch of black scales. On the forewing beneath is a small ordinary glandular patch of black scales above the submedian vein. Underside brighter brown. Both wings with the basal area indistinctly striated with darker brown, a transverse discal narrow violet-grey band, and greyish-ochreous marginal lines. *Forewing* with three small prominent subapical ocelli, and a moderately-large lower median ocellus, both sets encompassed by a pale violet-grey outer line. *Hindwing* with seven prominent ocelli, the second, third, sixth, and seventh the smallest. Female as in male, except in the absence of the tuft, dilated median veins, and glandular patches. *Body* beneath, legs, and sides of palpi pale ochreous-brown.

Expanse, $1\frac{7}{8}$ to $2\frac{1}{8}$ inches.

DRY-SEASON BROOD (Plate 72, fig. 1, b, ♂).

Mycalesis Khasiana, Moore, Proc. Zool. Soc. Lond. 1874, p. 566.

Kabanda Khasiana, Moore, Trans. Ent. Soc. Lond. 1880, p. 168.

Mycalesis (Kabanda) Khasiana, Marshall and de Nicéville, Butt. of India, etc. i. p. 127 (1883).

IMAGO.—Male. Upperside dark umber-brown, paler at the apex and along the exterior border; marginal lines also paler. Subbasal tuft and dilated median branches, and glandular patches, as in wet-season brood. Underside bright vinous-brown basally, and violet-grey along exterior border. Both wings numerous covered with minute dark brown strigæ; transverse discal violet-grey band very narrow, and a distinct yellowish narrow marginal line. *Forewing* with five, and *hindwing* with seven minute perfect ocelli.

Expanse, $1\frac{7}{8}$ inch.

HABITAT.—Khasia Hills, Cherra Punji, Sibsagar, Silhet, Cachar, Naga Hills.

SEASONAL VARIATION.—Mr. L. de Nicéville (J. A. S. Bengal, 1888, 273), says: "Through the kindness of the Rev. W. A. Hamilton I have recently received from Silhet twelve males and two females of this species, all captured within a short period of one another. As regards the upperside they show no variation. The species is a remarkable one, having no ocelli whatever above. The undersides, however, of these fourteen specimens (selected for me from a very considerable number purposely to show these variations) exhibit a perfect gradation, from a specimen with a single ocellus only (and that most minute, in the first median interspace of the hindwing, all the other ocelli being reduced to minute dots) to another with the ocelli as large as shown in Mr. Butler's figure. In addition to this ocellular variation, we have, concomitantly, quite as great a diversity in the ground colour. In the form with the obsolete ocelli, the basal two-thirds of the wings are ochreous-brown, and the outer third, with the abdominal margin of the hindwing, is purplish-grey. In the form with all the ocelli large and perfect, we have the whole of the

ground colour much darker, the discal purple line much more prominent, the purplish-grey border of the other form entirely absent, and the series of ocelli surrounded by a purple line. Every gradation is before me between the two extremes. Mr. Hamilton obtained a very long series of it in the spring, below Shillong in Silhet; the greater portion were, as they should have been, of the dry-season form, but a few were of the other extreme, and these he picked out, together with intergrade specimens between the two extremes, and sent them to me. The prevailing form of this species is therefore *Khasiana* in the dry season and true *Malsarida* in the wet season; and the occasional appearance of the one form or the other out of its proper season will not upset the main fact of the occurrence of two distinct well-marked forms corresponding to the seasons, the dry and the wet, into which the Indian climate may be primarily divided."

DISTRIBUTION.—The wet-season form has been taken in the Khasia Hills in August. The late Mr. W. S. Atkinson obtained it at Cherra Punji. Specimens from Sibsagar, in Assam, are in the Indian Museum, Calcutta. Mr. J. Wood-Mason (J. A. S. Bengal, 1887, 350) records "one male from Cachar, taken on Nemotha Peak in September." Mr. L. de Nicéville (J. A. S. Beng. 1888, 274) records "the capture of numerous specimens by the Rev. W. A. Hamilton below Shillong in Silhet, remarking also, that it may be considered to be a rare species, as it appears to be strictly confined to Assam, though it is probably common enough in the spots where it is found at all." An example from the Naga Hills is in the collection of Mr. P. Crowley.

Of the illustrations of this species on our Plate 72, fig. 1, 1a, represent a male of the wet-season brood, and fig. 1b, that of a male of the dry-season brood.

Genus NISSANGA.

Nissanga, Moore, Lep. of Ceylon, i. p. 23 (1880); Trans. Ent. Soc. Lond. 1880, p. 169.

Mycalesis (*Nissanga*), Marshall and de Nicéville, Butt. of India, etc. i. p. 131 (1883).

IMAGO.—Wings short. *Forewing* triangular, costa arched, exterior margin very slightly convex and nearly erect; costal, median, and submedian vein swollen at the base; second subcostal branch emitted at end of the cell. *Hindwing* bluntly conical; costa broadly convex at the base, and thence oblique to the apex; exterior margin oblique, convex; cell short, quadrate, broadest at its end; subcostal not swollen, its first branch emitted immediately before end of the cell; discocellular erect, radial from the middle; two upper median branches emitted at some distance beyond end of the cell. *Male* with a *tuft of fine hairs* overlapping a *glandular patch of scales* at base of the subcostal branches. Antennæ gradually thickened to the tip. Apical joint of palpi long and slender. Eyes hairy.

Type.—N. Patnia.

NISSANGA PATNIA (Plate 72, fig. 2, 2a, b, c, d, ♂, ♀).

Mycalesis Patnia, Moore, Catal. Lep. Mus. E. I. Compy., i. p. 232 (1857). Butler, Catal. Satyr. Brit. Mus. p. 146 (1868).

Nissanga Patnia, Moore, Lep. Ceylon, i. p. 23, pl. 12, fig. 2, 2a, ♂ (1880). Trans. Ent. Soc. Lond. 1880, p. 170.

Mycalesis (Nissanga) Patnia, Marshall and de Nicéville, Butt. of India, etc. i. p. 131 (1883).

IMAGO.—Male. Upperside dusky ochreous-brown, darkest externally; marginal lines ochreous-yellow, slender; cilia pale cinereous-brown. *Forewing* with a more or less developed small, longitudinally-narrow, subapical ocellus, which is black, white-pupilled, and ringed with dark ochreous; a large prominent median ocellus, which is ringed with pale ochreous-yellow, the ring being broadest anteriorly; this latter ocellus more generally showing only the anterior portion, the posterior portion of the yellow outer ring not being continued below the median vein, and thus giving it the appearance of a squinting eye; within the discal area is a broad medial more or less triangular ochreous-yellow patch, which sometimes is restricted, and then extends broadly only on the median veins. *Hindwing* sometimes with two minute median more or less prominent ocelli, and the median vein with its branches lined with ochreous-yellow; a subbasal tuft of cinereous-white hairs radiating over or overlapping a *glandular patch of black scales* at base of the subbasal branches. Underside deeply ochreous-yellow, marginal lines bright yellow, and bordered with black. *Forewing* with a very small elongated white-pupilled subapical ocellus, and large prominent paler ochreous lower ocellus, the latter sometimes posteriorly thickly speckled with black scales; both ocelli being outer ringed with dark ochreous-red; and then encompassed by an outer silvery band; within the cell are three transverse ochreous-red lines, and a fourth line crossing the disc, the latter line being externally bordered by a silvery band; posterior border broadly nacreous from the base to discal band. *Hindwing* with seven ocelli, of which the upper first, fourth, and fifth are small but prominent, the second, third, sixth, and seventh being minute (the second and third generally being indicated by a black dot only); the first or apical ocellus, and the fourth and fifth conjointly, are distantly encircled by an outer black ring of more or less intensity, and the whole seven encompassed by an outer silvery band; crossing the wing is a discal and subbasal ochreous-red line, the former being externally bordered by a silvery band.

Female. Upperside as in male, the median ocellus on the forewing generally paler bordered, and more squint-eyed. Underside as in male. *Body* beneath, ochreous; sides of palpi, and legs beneath pale cinereous-ochreous. Antennæ tipped with ochreous-red.

Expanse, ♂, ♀, $1\frac{1}{2}$ to $1\frac{3}{4}$ inch.

HABITAT.—Ceylon.

DISTRIBUTION.—According to Captain Wade (Lep. Ceylon, i. 23), this species is "very common at Galle and Kandy, and easy to capture." Mr. E. E. Green obtained it at Pundaloya and neighbourhood, in the Western Central District, in August and October. Major J. W. Yerbury has also taken specimens at Trincomali.

Of the illustrations of this species on our Plate 72, figs. 2a, b, represent a male and female from Galle, fig. 2 and 2c, a male from Pundaloya, and fig. 2d, a female from Trincomali.

NISSANGA JUNONIA (Plate 73, fig. 1, 1a, b, ♂ ♀).

Mycalesis Junonia, Butler, Catal. Satyridæ, Brit. Mus. p. 146, pl. 3, fig. 4 (1868).

Nissunga Junonia, Moore, Trans. Ent. Soc. Lond. 1880, p. 170.

Mycalesis (Nissunga) Junonia, Marshall and de Nicéville, Butt. of India, etc. i. p. 132, pl. 16, fig. 57, ♂ (1883).

IMAGO.—Male. Upperside dusky-brown, darkest exteriorly; marginal lines pale ochreous; cilia cinereous. *Forewing* with a minute subapical white-pupilled ocellate black spot, and a large black median ocellus, with minute white pupil and broadly circled round its upper half only with white, thus giving it much the appearance of a squinting-eye. *Hindwing* with or without one, or two, very indistinct minute ocellate spots; a subbasal tuft of white hairs overlapping the glandular patch of scales. Underside pale cinereous olivescens-brown, darker exteriorly; marginal lines bright ochreous and prominent. *Forewing* with three subbasal and a discal slender transverse dark ochreous-red lines; a minute slender subapical ocellus, and a large white-ringed median ocellus, the latter with its lower half brown speckled, and both ocelli with an outer dark ochreous-brown ring and encompassed by a dull silvery band. *Hindwing* with a subbasal and a discal transverse dark ochreous line, and seven minute ocelli, the upper or apical and the fourth and fifth conjointly distantly encircled by a dark ochreous-brown line, the whole seven again encompassed by a dull silvery band; above the anal angle is a bright ochreous-red patch. Female. Upperside and underside as in male; the subanal ochreous patch on the hindwing beneath less prominent. *Body* and legs beneath, and sides of palpi cinereous; antennæ tipt with bright ochreous.

Expanse, ♂ $1\frac{5}{8}$, ♀ $1\frac{3}{8}$ inch.

HABITAT.—Hills of S. India.

DISTRIBUTION.—Mr. S. N. Ward obtained it at Canara. Capt. R. Bayne Reed took it in the Wynad, Malabar. Mr. G. F. Hampson (J. As. Soc. Beng. 1888, 348) obtained it on the Nilgiris, being there confined to the southern and western slopes, at 2000 to 3000 feet, where it is common in heavy forest. Mr. H. Fergusson (Butt.

Ind. i. 132) observes that "in Travancore this species was not common in April, and only to be found in heavy forest at about 800 feet elevation, and later on in May that it was fairly common in the hills at the end of the month." Specimens are in the Indian Museum, Calcutta, from the Kadur District, Mysore.

Genus SURALAYA.

Suralaya, Moore, Trans. Ent. Soc. Lond. 1880, p. 159; Marshall and de Nicéville, Butt. of India, etc. i. p. 110 (1883).

Mycalesis (Sect. A, part), Distant, Rhop. Malayana, p. 49 (1882).

IMAGO.—*Forewing* comparatively long and narrow; costa slightly arched; apex rounded; exterior margin oblique, almost straight and even; base of costal, median and submedian vein swollen. *Hindwing* small, bluntly oval; exterior margin convex waved; first subcostal branch slightly swollen at its base, second very concave at its base; cell narrow; discocellular very oblique. Male. Underside of *forewing* with a large elongated patch of dark brown scales on middle of the submedian vein, the surrounding nacreous area extending from the base to beyond the discal band. Upperside of *hindwing* with a subbasal long slender *tuft of black hairs* overlapping a *glandular patch* of brown scales situated above the first submedian branch, and on the median area is a *large rounded glandular patch* of blackish lustreless scales. *Eyes almost naked*. Antennal club slender.

Type.—S. Orseis.

SURALAYA ORSEIS (Plate 73, fig. 2, 2a, b, ♂ ♀).

Mycalesis Orseis, Hewitson, Exotic Butt. iii. p. 89, *Myc.* pl. 6, figs. 36, 37, ♂ (1864); Butler, Catal. Satyr. B. M., p. 136 (1868); Distant, Rhop. Malayana, p. 49, pl. 5, fig. 4, ♂ (1882); Marshall and de Nicéville, Butt. of India, etc. i. p. 110 (1883).

Suralaya Orseis, Moore, Trans. Ent. Soc. Lond. 1880, p. 159.

Mycalesis Nautilus, Butler, Ann. and Mag. Nat. Hist. 1867, p. 402, pl. 9, fig. 7, ♀; *id.* Catal. Satyr. B. M. p. 136 (1868); Distant, Rhop. Malayana, p. 417, pl. 40, fig. 4, ♂ (1886); Marshall and de Nicéville, Butt. of India, etc. i. p. 120 (1883).

Calysime Nautilus, Moore, Trans. Ent. Soc. 1880, p. 162.

IMAGO.—Male. Upperside pale purpurescent-brown, suffused more or less with violaceous-blue, with the straight transverse pale discal fascia of the underside very slightly visible from above; marginal lines darker brown; cilia cinereous-brown. *Forewing* with the upper and lower submarginal ocelli of the underside slightly showing as dusky-black pale-ringed spots, in some specimens the three intervening ocelli are also slightly visible. *Hindwing* pale cinerescent-brown along the costal border, the anterior ocelli of the underside slightly visible from above; with a subbasal long slender *tuft of black hairs* overlapping a *glandular patch* of brown scales situated above the first submedian branch, and on the median area is a *large rounded*

glandular patch of blackish lustreless scales. Underside pale ochreous-brown, tinged with violaceous-brown externally. Both wings crossed by a straight discal narrow dark brown line, which is externally bordered by a broad more or less violaceous-white fascia; submarginal sinuous line and marginal line dark brown. *Forewing* with a linear series of five prominent ocelli, the four upper being small and the lowest large, the uppermost being situated between the subcostal and upper radial, and the lowest between the middle and lower medians, each having a dark brown ring outside the yellow iris; sometimes a minute black dot, or incipient ocellus, is visible between the lower median and the submedian vein; posterior margin broadly nacreous-white from the base to beyond the band and with an elongated *dark brown glandular patch* on middle of the submedian vein. *Hindwing* with seven prominent ocelli, of which the lower fifth is large, the others small, each outwardly ringed with brown.

Female. Upside paler and duller coloured than in male; the transverse pale discal fascia of underside slightly visible, but broader; the marginal lines dark brown. *Forewing* with the five, sometimes six, dusky ocelli of the underside indistinctly visible, each with a white pupil. *Hindwing* with the ocelli of the underside indistinctly visible, each with a white pupil. Underside paler than the upper-side; the transverse discal line and violaceous-white fascia broad and prominent; marginal lines dark brown. *Forewing* with five, sometimes six, ocelli, of which the lower fifth is the largest, and the lowest minute. *Hindwing* with seven ocelli; all the ocelli, on both wings, with a brown ring outside the yellow iris. *Body* beneath, legs, and lateral streaks on palpi, pale ochreous-brown. Antennæ with ochreous-yellow club, banded with black.

Expanse, ♂ $1\frac{7}{8}$ to $2\frac{1}{8}$, ♀ $2\frac{1}{8}$ to $2\frac{3}{8}$ inches.

HABITAT.—Tenasserim. Malayana.

DISTRIBUTION.—A single example of the female (figured on our Plate 73, fig. 2b), and now in Mr. F. D. Godman's Collection, was taken at Meetan, in Upper Tenasserim, by Mr. A. O. Hume. The type specimen of the male, figured by Hewitson, is from Singapore, where it was collected by Mr. A. R. Wallace. Other males are recorded by Mr. Distant (Rhop. Malay, pp. 416, 417) from Sungei Ujong, and Perak, in the Malay Peninsula. It has also been taken in Sumatra, and Nias Island; and Mr. W. B. Pryer obtained it in Borneo.

All the males of this species (including the Singapore type) have the large rounded glandular patch of lustreless scales on the median area of the upper-side of the hindwing; as is also the case in examples from Borneo, though this patch is omitted to be described or figured by Mr. Distant (Rhop. Malay, p. 49, pl. 5, fig. 4) in treating of *M. Orseis*. In some Bornean examples, the transverse fascia, on the underside of both wings, is less palely virescent-white than in others. Of the identity of the Hewitsonian *M. Orseis* with the *M. Nautilus*, I have satisfied myself

by having had the opportunity of personally examining the type specimens of both. Of the illustrations of this species on our Plate 73, fig. 2 represents a Malayan male; fig. 2a the Meetan female taken by Mr. A. O. Hume, and fig. 2b is a reproduction of Mr. Butler's figure of *M. Nautilus*—which agrees in every respect with the underside of the Meetan female.

Genus LOESA.

Loesa, Moore, Trans. Ent. Soc. Lond, 1880, p. 177.

Mycalasis (Loesa), Marshall and de Nicéville, Butt. of India, etc. i. p. 132 (1883).

IMAGO.—Male. *Forewing* somewhat elongated and narrow; costa much arched, exterior margin oblique and slightly convex; second subcostal branch emitted at some distance beyond the cell; costal, median, and submedian swollen at the base. *Hindwing* bluntly ovate; costa arched at the base; apex, exterior margin, and anal angle convex; with a *tuft of fine hairs* arising from lower base of the subcostal, and overlapping a *glandular patch of scales*, and another *slender tuft of hairs* covering a groove on the middle of the submedian vein; cell short, broad in the middle; subcostal concave at its base, first branch emitted close to end of the cell, second concave at its base; discocellulars long, oblique, straight; two upper median branches from end of the cell. Antennæ with a well-formed terminal club; palpi pointed at tip; eyes hairy.

Type.—L. Oroatis.

LOESA SURKHA.

WET-SEASON BROOD (Plate 73, fig. 3, ♂).

Mycalasis ustulata, Distant, Rhoplocera Malayana, p. 418, pl. 41, fig. 16, ♂ (1886).

IMAGO.—Male. Upperside bright rufous-brown, with the costa and outer border of the forewing and the outer border of the hindwing brown. *Forewing* with a moderate-sized, almost blind, ocellate spot between the middle and lower medians. *Hindwing* with a subcostal *tuft of fine ochraceous hairs* overlapping a *glandular patch of scales*, and another *slender tuft of hairs* covering a groove on the middle of the submedian vein. Underside dark olivescient-brown, with a slight dusky, slender subbasal line, and a transverse discal prominent narrow violet-grey band; marginal lines pale ochreous-brown. *Forewing* with a moderate-sized subapical and a larger median ocellus, each with a white pupil and yellowish ring (in some specimens two intermediate minute ocellules are present), each set encompassed by a pale ochreous-brown outer ring. *Hindwing* with seven prominent ocelli, of which the four upper and the two lowest are small, the fifth large, all encompassed by a pale ochreous-brown outer line. *Body* beneath and legs, and sides of palpi pale cinereous-brown.

Expanse, 2 inches.

DRY-SEASON BROOD (Plate 73, fig. 3a, ♂).

Mycalesis Surkha, Marshall, Journ. Asiatic Soc. Bengal (Jan. 1882), p. 37, pl. 4, fig. 1, ♂.

Mycalesis (Loesa) Surkha, Marshall and de Nicéville, Butt. of India, etc. i. p. 133 (1883).

Loesa fervida, Butler, Annals and Mag. Nat. Hist. (Nov. 1882), p. 372, ♂.

IMAGO.—Male. Upperside as in the wet-season form, though of somewhat paler rufous-brown, and paler brown margins. *Forewing* with a minute black dot in the upper discoidal, and an ocellus between the lower medians. *Hindwing* with a similar subbasal and a submedian tuft of hairs. *Underside*. Both wings with the slight dusky subbasal line, and the olivescence-grey transverse discal band; marginal lines pale. *Forewing* with a minute subapical and median white-pupilled black spot. *Hindwing* with seven minute similar white-pupilled dots, the fifth being somewhat the largest. Female unknown.

Expanse, 2½ inches.

HABITAT.—Upper Tenasserim; Malay Peninsula; Sumatra.

DISTRIBUTION.—Within our area, the dry-season form (*Surkha*) was taken by Capt. C. T. Bingham in January, in the Donat Range, Upper Tenasserim, and also in the lower Thoungyeen forests (Butt. Ind. i. 133). Mr. H. J. Elwes (J. A. S. Beng. 1887, 418) also records "three males from Tavoy and one from Ponsekai." The wet-season form (which I take to be the *ustulata* of Mr. Distant) was taken by Herr Kunstler at Perak, in the Malay Peninsula. A male of this latter form, from Sumatra, is also in the British Museum Collection.

Of the illustrations of this species on our Plate, No. 73, fig. 3 represents the male of the wet-season form (copied from Mr. Distant's Rhop. Malayana, pl. 41), and fig. 3a, that of a male of the dry-season form, copied from Mr. Marshall's figure in J. A. S. Bengal.

Genus MYRTILUS.

Mycalesis, subgenus *Myrtilus*, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1891.

"MALE.—*Forewing*, costa strongly and regularly arched; apex rounded; outer margin nearly straight; inner angle acute; inner margin at first slightly marginate, then just beyond the middle strongly bowed outwards; costal nervure swollen at base, ending on the costa beyond the apex of the discoidal cell; first subcostal nervule emitted at about one-fifth before the end of the cell, terminating on the costa about opposite to the origin of the third subcostal; second subcostal originating a little before the end of the cell, ending on the costa a little before the origin of the fourth subcostal; third subcostal arising exactly midway between the apex of the cell and the origin of the fourth subcostal, terminating on the costa about midway between the origin of the fourth subcostal and the apex of the wing; fourth subcostal short, ending at the apex of the wing; terminal portion of sub-

costal nervure longer than fourth subcostal nervule, ending on the outer margin below the apex of the wing; upper discocellular nervule extremely short; middle discocellular about one-fourth as long as the lower discocellular, straight, strongly inwardly oblique; lower discocellular at first strongly inwardly oblique, in a straight line with the middle discocellular, this portion being a little longer than that vein, then suddenly curved and strongly outwardly oblique, straight portion to the curve; median nervure strongly swollen at base; third median nervule strongly curved; second median arising long before the lower end of the cell; discoidal cell reaching exactly to the middle of the wing; submedian nervure swollen at base, beyond this swollen portion distorted and deflected downwards, afterwards straight to the outer margin; a large *patch of androconia* occupying the lobe-like dilation of the inner margin, and extending as far as the middle of the submedian interspace, placed on the underside of the wing. *Hindwing*, costa arched at base, then almost straight to apex; outer margin slightly curved, gently scalloped; abdominal margin almost straight; precostal nervure short, simple, directed towards the apex of the wing; costal nervure short, not reaching to the middle of the costal margin, regularly curved throughout its length; first subcostal nervule curved, arising just before the apex of the cell, and terminating at the apex of the wing; second subcostal nearly straight, ending on the outer margin below the apex; discoidal cell short, its lower end not reaching to the middle of the wing; discocellular nervules almost straight, strongly outwardly oblique, the lower a little longer than the upper; third median nervule strongly curved; second median originating just before the lower end of the cell; submedian nervure straight, distinctly swollen towards the base for some considerable portion of its length, ending just anterior to the anal angle; internal nervure short, recurved; a large *patch of androconia* about the apex of the cell, occupying a considerable area in the subcostal interspace, the base of the first and second subcostal interspaces, and extending into the apex of the cell; a strong *tuft of hairs* of a brown colour arises from near the base of the cell and is directed outwardly, lying across the anterior portion of the androconial patch; there is also a *second strong tuft of hairs* of a black colour arising close to the base of the submedian nervure and lying along the swollen portion of that vein. Eyes hairy. Antennæ a little less than half the length of the costa of the forewing, with a rather large, well-formed club."

MYRTILUS MYSTES.

Mycalesis Mystes, de Nicéville (Watson, Journ. Bombay Nat. Hist. Soc. 1891, p. 34).

Mycalesis (Myrtilus) Mystes, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1891, pl. F. fig. 1, *dry-season* ♂; fig. 2, *wet-season* ♂.

"**DRY-SEASON FORM.**—Male. Upperside, *both wings* brown, the extreme outer

margins paler, bearing two very fine brown lines. Cilia cinereous. *Forewing* with three very small (the posterior rather the largest) blind black ocelli, one each in the two discoidal and upper median interspaces, each surrounded with a fine outer yellow line; a similar large ocellus in the same straight line as the other ocelli, and touching the lowermost, in the first median interspace, which it slightly overlaps, centred with a minute silvery pupil. *Hindwing* unmarked. Underside, *both wings* ochreous-yellow, the basal darker than the outer half; a prominent perfectly straight discal band, not quite reaching the costa of the forewing nor the abdominal margin of the hindwing, this band is formed of an inner dark-brown line which becomes lost in the ground-colour, outwardly sharply defined by a whitish line, which also soon becomes lost in the ground-colour; beyond this prominent discal band is a nebulous band of a darker shade than the ground, and bearing in the forewing four, and in the hindwing seven, pale blue most minute dots, one in each interspace, these being the pupils of obsolete ocelli; a waved submarginal band."

"WET-SEASON FORM.—Male. Upperside, *both wings* brown, the extreme outer margins paler, bearing two wavy brown lines. Cilia cinereous. *Forewing* with a single round black ocellus in the first median interspace, beyond which it does not extend, pupilled with white, with a narrow outer pale ring. *Hindwing* unmarked. Underside, *both wings* brown, the outer margin bearing two yellowish waved lines, the disc crowned by a narrow perfectly straight pure white band which does not quite reach the costa of the forewing nor the abdominal margin of the hindwing. *Forewing* with four ocelli enclosed in a single outer yellowish line, the two upper ocelli equal sized, the third the smallest, the fourth and lowest the largest. *Hindwing* with seven ocelli, also enclosed by one line, of which the first (uppermost), the fourth and the fifth are the largest, the third and the seventh equal sized and the smallest."

Expanse, 2 inches.

HABITAT.—Upper Burma.

"The dry-season form of *M. mystes* is easily recognizable by the curious ochreous-yellow colour of the ground on the underside, but the wet-season form is so precisely similar to many specimens of the same season form of *M. (Calysisme) mineus*, that it might be easily confounded with that species. The male, however, has the conspicuous tuft of black hair on the upperside of the hindwing, springing from near the base of the submedian nervure, which is characteristic of this subgenus, and is not found in *Calysisme*, and by which it can be easily recognized. In the subgenus *Loesa*, this tuft is yellow not black, and springs from the middle instead of near the base of the submedian nervure. The females of the wet-season form of *M. mystes* will, probably, be difficult to recognize, as in neuration and markings they will, probably, be found to be almost exactly like *M. mineus*." (de Nicéville, *l. c.*)

Described by Mr. L. de Nicéville from two males of the dry-season form, captured on the 1st and 19th March, 1890, and from a single male of the wet-season form taken on the 23rd November, 1890, by Capt. E. Y. Watson, at Tilin Yaw, Upper Burma, during the Chin-Lushai Expedition of 1889-90.

INDO-MALAYAN and CHINESE allied genera and species of the MYCALESIS group.—

IA. *Males with a glandular patch and tuft on both wings.*—*Gareris Perdiccas*, Hewits. Ex. Butt. iii. Myc. pl. 3, fig. 15 (1862); Moore, Tr. Ent. Soc. 1880, p. 157. *Habitat.* N. China, Japan.—*Satoa Maianeas*, Hewits. Exot. Butt. ii. p. 87, Myc. pl. 5, fig. 27, 28, ♀ (1864); Moore, Tr. Ent. Soc. 1880, p. 157; Distant, Rhop. Malay. p. 48, pl. vii. fig. 4, ♀ (1882). *Habitat.* Malay Peninsula, Sumatra, Borneo.—*Sadarga Gotama*, Moore, Catal. Lep. Mus. E. I. C. i. p. 232 (1857); *id.* Tr. Ent. Soc. 1880, p. 158; *Syn.* M. Borealis, Feld. Reise Nov. Lep. iii. p. 500 (1867). *Habitat.* N. China, Japan.—*Sadarga Madjicosa*, Butler, Catal. Satyr. B. M. p. 137, pl. 3, fig. 10, ♀; Moore, Tr. Ent. Soc. 1880, p. 158. *Habitat.* Madjico-Sima.—*Dalapa Sudra*, Feld. R. Nov. Lep. iii. p. 500, pl. 67, fig. 10 (1867). *Habitat.* Java, Sumatra.—*Dalapa Nala*, Felder, Wien. Ent. Monat. 1859, p. 403. *Habitat.* Java.—*Ib. Males with a glandular patch and tuft on hindwings only.*—*Calysisme Igoleta*, Feld. Wien. Ent. Monats. vii. p. 127 (1863); Semper, Reisen Arch. Philip. Lep. pl. 10, fig. 17, 18, ♂, ♀ (1886). *Habitat.* Philippines.—*Calysisme philippina* (M. Mineus, apud Semper, Reisen Arch. Phil. Lep. pl. 10, fig. 11, 12, ♂, ♀ (1886). *Habitat.* Philippines.—*Calysisme semperi* (M. Drusia, apud Semper, l. c. pl. 10, fig. 13, 14, ♂, ♀ (1886). *Habitat.* Philippines.—*Calysisme Justinella*, Butler, Catal. Satyr. B. M. p. 135, pl. 3, fig. 12 (1868); Semper, l. c. pl. 10, fig. 15, 16, ♂, ♀ (1886). *Habitat.* Philippines.—*Indalasa Moorei*, Felder, Reise Nov. Lep. iii. p. 502, pl. 67, fig. 9 (1867); Moore, Tr. Ent. Soc. 1880, p. 166. *Habitat.* Java.—*Martanda Janardana*, Moore, Catal. Lep. Mus. E. I. C. i. p. 234 (1857); *id.* Tr. Ent. Soc. 1880, p. 169; Distant, Rhop. Malay. p. 54, pl. v. fig. 2 (1882). *Habitat.* Malay Peninsula, Java, Sumatra.—*Martanda Sangaica*,* Butler, Ann. N. H. 1877, p. 95; Moore, Tr. Ent. Soc. 1880, p. 169. *Habitat.* Shanghai, N. China.—*Martanda regalis* (Leech, Tr. Ent. Soc. 1889, p. 102, pl. 8, fig. 2, 2a), ♂, ♀. *Habitat.* China.—*Mydosama fuscum*, Feld. Wien. Monats. iv. p. 401 (1860); Moore, Tr. Ent. Soc. 1880, 170; Distant, Rhop. Malay. p. 53, pl. v. fig. 1, ♀ (1882); *Syn.* M. Diniche, Hewits. ♂, M. Margites, Hewits. ♀. *Habitat.* Malay Peninsula, Singapore, Sumatra, Borneo.—*Mydosama Anapita*,

* This species is, generically, quite distinct from *Gareris perdiccas*, with which latter it is erroneously placed as a synonym by Mr. Elwes (P. Z. S., 1881, 903), and also by Mr. Leech (Trans. Ent. Soc. 1889, 103). *Sangaica* is easily distinguished from *perdiccas* in having a glandular tuft of hairs on the submedian vein of both the fore and hindwing—whereas in *perdiccas* there is a tuft only on forewing.

Moore, Catal. Lep. Mus. E. I. C. i. p. 232 (1857); *id.* Tr. Ent. Soc. 1880, p. 171; Distant, Rhop. Malay. p. 418, pl. 39, fig. 8 (1886). *Habitat.* Malay Peninsula, Sumatra, Borneo.—*Mydosama Remulia*, Cram. iii. pl. 237, fig. F. G. (1779); Moore, Tr. Ent. Soc. 1880, p. 171. *Habitat.* Java.—*Mydosama Megamede*, Semper, Reisen Archipel. Phil. Lep. p. 53, pl. 10, fig. 3, 4, ♂, ♀ (1886). *Habitat.* Philippines.—*Mydosama Felderi*, Butler, Catal. Satyr. B. M. p. 144, pl. 3, fig. 5 (1868); Semper, l. c. p. 54, pl. 10, fig. 5, 6, ♂, ♀ (1886). *Habitat.* Philippines.—*Mydosama Ita*, Felder (Reise, Nov. Lep. iii. pl. 68, fig. 8, 9); Semper, l. c. p. 54, pl. 10, fig. 7, 8, ♂, ♀ (1886). *Habitat.* Philippines.—*Mydosama Casonia*, Wallengren, Wien. Ent. Monats. 1860, p. 36; Semper, l. c. p. 52, pl. 10, fig. 19, 20, ♂, ♀ (1886). *Habitat.* Philippines.—*Mydosama marginata*, Moore, Tr. Ent. Soc. 1881, p. 307. *Habitat.* Sumatra.—*Mydosama Dohertyi* (M. Doherty, Elwes, P. Z. S. 1891, p. 261, pl. 27, fig. 3, 4, ♂, ♀). *Habitat.* Perak, Malay Peninsula.—*Nebdara Tagala*, Felder (Reise, Nov. Lep. iii. pl. 67, fig. 7, 8). Moore, Tr. Ent. Soc. 1880, p. 174; Semper, l. c. p. 56. *Habitat.* Philippines.—*Nebdara Bisaya*, Felder, Wien. Ent. Monats. 1863, p. 127; Semper, l. c. p. 55, pl. ii. fig. 2, 3, ♂, ♀ (1886); Syn. M. Semperi, Butler, M. Mareotis, Hewits. *Habitat.* Philippines.—*Nebdara Amaena*, Druce, P. Z. S. 1873, p. 339, pl. 32, f. 1. *Habitat.* Borneo.—*Nasapa Aramis*, Hewits. Ex. Butt. iii. 91, Myc. pl. 7, fig. 43 (1866); Semper, l. c. p. 55. *Habitat.* Philippines. Ic. *Males with two glandular patches and tufts of hair on hindwing*:—*Loesa Oroatis*, Hewits. Exot. Butt. iii. Myc. pl. 6, fig. 38, 39 (1864). *Habitat.* Java.

Genus NEORINA.

Neorina, Westwood, Doubleday and Hewitson's Genera of Diurnal Lep. p. 369 (1851). Marshall and de Nicéville, Butt. of India, etc. i. p. 133 (1883). Distant, Rhop. Malay. p. 415 (1886).

IMAGO.—Male. Wings large, short, broad. *Forewing* short, subtriangular; costa arched, apex obtuse, exterior margin slightly oblique, nearly straight, posterior angle rounded; costal vein slightly swollen from the base, median and submedian scarcely perceptibly swollen; cell broad, rather short, not reaching half length of the wing; first and second subcostal branches close together, the first emitted

The following is a Chinese Satyrid combining a similarity of pattern of the markings on the upper-side with the *Mycalesis* group and on the underside with those of the *Lethe* group:—gen. nov. *Pegada*. Male. Wings short, broad. Upperside with the basal area slightly hairy. Underside with the basal two-thirds very numerous covered with short fine hairs. *Forewing* subtriangular; costa slightly arched, apex and posterior angle obtusely rounded, exterior margin slightly convex; cell broad, long; discocellulars incurved. *Hindwing* bluntly ovate; exterior margin very slightly wavy; cell broad across the middle, long; discocellulars very oblique, angular in the middle; the middle median veinlet emitted at some distance before end of the cell. Palpi long, slender, very hairy in front; middle and hind-legs naked; antennæ short, slender, club gradually thickened; eyes hairy. Type.—*P. oculatissima* (*Mycalesis oculatissima*, Poujade, Bull. Soc. Ent. France, 1885, p. xxv. Oberthur, Etudes Entom. 1890, p. 43, pl. x, fig. 104).—*P. occulta* (*Lethe occulta*, Leech, Entomologist 1890, p. 26). *Habitat.*—W. China.

about one-fourth before end of the cell; discocellulars outwardly oblique, short, lower slightly concave, lower radial from angle near upper end; middle median veinlet emitted at about one-fourth and lower veinlet at two-fourths before end of the cell; submedian recurved. *Hindwing* broad, bluntly ovate; costa arched at the base; apex rounded; exterior margin convex, slightly scalloped and somewhat angular in the middle; abdominal margin long; costal vein arched at the base; cell short, small; first subcostal branch emitted at nearly one-third before end of the cell; discocellulars slightly oblique, upper shortest, angular in the middle, radial from the angle; two upper median branches emitted from end of the cell, lower branch at about one-third before the end; submedian nearly straight. *Body* robust, laxly clothed; head large; eyes large, smooth; palpi broad, ascending, compressed and laxly clothed, hairy in front, apical joint small and laxly scaled. Antennæ long, slender, terminating in an elongated slender gradually-formed club. Middle and hindlegs stout, long, scaly. Eyes naked.

Type.—N. Hilda.

NEORINA HILDA. (Plate 74, fig. 1, 1a, ♂ ♀).

Neorina Hilda, Westwood, in Doubleday and Hewitson's Gen. D. Lep. p. 370, pl. 65, fig. 2, ♂ (1851).

Moore, Catal. Lep. Mus. E. I. C. i. p. 226 (1857). Butler, Catal. Satyr. Brit. Mus. p. 111 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 134 (1883).

IMAGO.—Male. Upperside rich deep olivescient ochreous-brown, with two submarginal blackish lunular lines; cilia ochreous-yellow, brightest on the hindwing. *Forewing* with the apical half more dusky-brown; an oblique sinuous-bordered bright ochreous-yellow broad band crossing from middle of the costa to posterior angle, this band being indented at end of the cell; beyond is an incurved subapical series of four white spots, of which the upper second is the largest, the third being minute and centring the large slightly-apparent blackish spot of the underside. *Hindwing* with a prominent narrow ochreous-yellow fascia bordering the apex, and some yellow scales externally bordering the outer submarginal line. Underside dark olivescient ochreous-brown; the two submarginal black sinuous lines being very prominent, and the inner line more or less bordered inwardly with lilacine-blue scales. *Forewing* with the ochreous-yellow oblique band as on upperside; the apical white spots, and a large blue-black subapical ocellus with yellow outer ring, all very prominent. *Hindwing* with yellow apical border as above; a prominent large blue-black subapical ocellus, and four lower much smaller and less defined ocelli with blue-speckled centres, of which the three upper anteriorly decrease to a minute spot, and the lower or subanal ocellus only being ringed with yellow; with a subbasal and a discal

slender indistinct blackish zigzag line, the space between them and along the abdominal margin, with the outer discal area distinctly irrorated with ochreous-yellow scales. Female. Upperside as in the male, except that on the hindwing the outer margin is strongly irrorated with yellow scales. Underside also as in the male. *Body* and legs beneath paler ochreous-brown; forelegs beneath ochreous-yellow; a streak on side of head and on sides of the palpi also ochreous-yellow; antennæ reddish.

Expanse, $3\frac{3}{4}$ to 4 inches.

HABITAT.—N.E. India (Sikkim; Bhotan; Assam).

DISTRIBUTION AND HABITS.—“This lovely insect is one of those most characteristic of the dark gloomy Oak and Chestnut forests of the Eastern Himalayas, and occurs from the end of June till September at 7000 to 9000 feet. It flies up and down the paths in dense forests, and settles on the ground or on tree trunks, when it is not so conspicuous as it is on the wing. The female is either much rarer or more seldom seen than the male; but I once saw one flying rapidly over the bare open top of the Observatory-hill at Jellapahar, which is a very favourite place for the females of many forest-loving butterflies to fly on sunny mornings in the rainy season, and, after a stiff race with a burly bombardier from the dépôt, who was a regular collector on this spot, I netted the prize. I found the species much commoner to the eastward, in British Bhotan than in Sikkim.” (Elwes, Trans. Ent. Soc. 1888, 307). It also occurs in Assam.

NEORINA WESTWOODII (Plate 74, fig. 2, 2a, ♂ ♀).

Neorina Crishna, apud Marshall and de Nicéville, Butt. of India, etc. i. p. 135, pl. xiv. fig. 34, (1883). (*nec Westwood.*)

IMAGO.—Male upperside rich dark purpurescent ochreous-brown; with two submarginal blackish broad lunular lines; cilia of the forewing posteriorly, and of the entire hindwing pale yellow. *Forewing* with a broad pale yellow sinuous-bordered band crossing obliquely from middle of the costa to the posterior angle, the discocellular veinlet being slenderly brown lined; a large indistinctly defined black subapical spot centred by a white dot, above which are two inwardly-oblique pure white apical spots, and below it is another white dot placed at an outwardly-oblique angle to the one in the black spot. *Hindwing* with a short pale yellow band bordering the apical angle. Underside dark dusky olivescient ochreous-brown, palest on the apex of forewing; both wings with two prominent submarginal black sinuous lines; the inner submarginal line and the area within the submarginal line, on both wings, and

the abdominal area on the hindwing thickly irrorated with lilacine-grey scales. *Forewing* with a large subapical blue-black ocellus with a minute white pupil and a narrow ochreous-yellow and a black outer ring; above which are the two white apical oblique spots and below it two smaller white spots; the broad oblique band paler than above, and the discocellular brown streak broader. *Hindwing* with the apical border yellow; with a short subbasal and an entire discal transverse blackish zigzag line; a large prominent subapical and also a subanal blue-black ocellus, each with a minute white pupil and blue speckles, an ochreous-yellow and a black outer ring, the yellow ring dilated inwardly; between these two large ocelli are three very small blue-speckled black spots. Female. Upper and undersides paler than in the male; markings the same. Body beneath ochreous-brown; sides of head, streak on sides of palpi, and forelegs beneath ochreous-yellow.

Expanse, $4\frac{1}{2}$ to 5 inches.

HABITAT.—N.E. India (Assam, Cachar).

This is a larger insect than *N. Crishna*, with which it has hitherto been erroneously associated. The latter species (*Crishna*) is from Java, the type specimen, from which the original description was taken, being then in the East India Company's Collection, and is referred to in the Catal. Lep. Mus. E. I. C. i. p. 221, as *Cyllo Crishna*, but now deposited in the British Museum. *N. Westwoodii* differs from it, on the upperside, in the forewing having the yellow band somewhat broader, the black apical spot being much larger and not encircled with yellow; there are also two small white spots above and one below this black spot, these small white spots being, moreover, placed at an outwardly-oblique angle from the central dot in the black spot, whereas, in *Crishna*, the white spot above and the one below the black ocellus are both in a direct vertical line with its central white dot. On the hindwing the pale yellow apical border is longer, and no ocelli are present, whereas in *Crishna* there are two, and in some specimens three, distinct ocelli, the two upper being of large size and a smaller one subanal. On the underside, the forewing has the yellow band also broader, the discocellular brown streak being entire; the apical ocellus is four times the size of that in *Crishna*, with its adjacent upper and lower white dots placed in position as on the upperside. The hindwing has the apical ocellus also larger; the subanal ocellus is also as large again as that in *Crishna*, and there is no indication of the small anal ocellus. Other minor differences in *Crishna* are that the latter species has a pale yellow dentate spot close to the costal vein within the cell of the forewing, and in the hindwing there is a black dot within the middle of the cell, whereas in *Westwoodii* there is a zigzag blackish subbasal line. Expanse of *Crishna* $3\frac{3}{4}$ inches.

DISTRIBUTION.—“Mr. Wood-Mason took several males on Nemotha, 3300 feet elevation, in Cachar, in September and October. There are specimens in the Indian

Museum, Calcutta, from Cherra Punji, Assam, and in Major Marshall's from Shilong." (De Nicéville, Butt. Ind. 136). Specimens were also obtained at Cherra Punji by the late Mr. W. S. Atkinson, and by Col. Godwin-Austen.

INDO-MALAYAN ALLIED SPECIES OF *NEORINA*.—The other known species of this genus are *N. Lowii*, Doubleday and Hewitson, Gen. D. Lep. p. 369, pl. 61, fig. 4 (1851). Distant, Rhop. Malay. p. 416, pl. 37, fig. 3 (1886). Staudinger, Exot. Schmett. p. 223, pl. 79, ♂ (1887). Mr. W. Doherty (J. A. S. Bengal, 1889, 124) says, "I have often observed *N. Lowii* in Borneo, the Malay Peninsula, and Eastern Java (where, however, the local representative may be distinct). It is continually changing its perch, flitting round and round the passer-by, and alighting with the wings partly or wholly open. When flying, it has the strongest possible resemblance to *Papilio Helenus*, and it may possibly be advantageous for a scarce, rather weak-flying insect of Morphid or Satyrid affinities to resemble a common Papilio of powerful and irregular flight." HABITAT.—Malay Peninsula; Nias; Sumatra; Borneo.—*N. Patria*, Leech, The Entomologist, 1891, p. 25. HABITAT.—W. China.—*N. Princesa*, Staudinger, Iris, 1889, p. 36. HABITAT.—Palawan.

Genus CÆLITES.

Cærites, Westwood in Doubleday and Hewitson's Genera of Diurnal Lep. p. 367 (1851). Distant, Rhop. Malay. p. 45 (1882). Marshall and de Nicéville, Butt. of India, etc. i. p. 100 (1883).

IMAGO.—Male. *Forewing* triangular; costa much arched, apex rounded, exterior margin somewhat concave, very slightly scalloped, posterior angle rounded, posterior margin short; costal vein perceptibly swollen; cell long, extending more than half length of the wing; first subcostal branch emitted at about one-fourth before and second branch close to end of the cell; discocellulars concave, upper short and bent close to subcostal, the upper radial from the angle, the lower radial from the middle; the middle median branch emitted at one-fourth and lower branch at more than half before end of cell; submedian straight. *Hindwing* short, quadrangularly-ovate, the exterior margin being slightly scalloped and angular in the middle; abdominal margin long; subcostal vein much arched; cell extending to half the wing; first subcostal branch emitted at about one-third before end of the cell; discocellulars outwardly oblique, upper shortest, radial from the angle; two upper median branches from extreme end of the cell, lower branch at about one-third before the end; submedian straight, internal vein recurved. A large *spatular-shaped glandular patch* of blue-black lustreless scales situated broadly on both sides of the submedian vein near its base, overlapping which, and also extending partly along the outer side of the submedian are numerous fine long black hairs. Female less concave below the apex of fore-

wing, and less angular on hindwing. Body short; head small; palpi compressed, second joint projected half beyond the front, apex small and pointed; legs short; antennæ very slender, with a slightly perceptible lengthened club; eyes naked.

Type.—C. Nothis.

CÆLITES NOTHIS (Plate 75, fig. 2, ♂).

Cælitès Nothis, Westwood in Doubleday and Hewitson's Gen. D. Lep. p. 367, pl. 66, fig. 2, ♀ (1851).

Butler, Catal. Satyr. Brit. Mus. p. 111 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 101 (1883).

IMAGO.—Male and female. Upperside dusky purplish-brown. Both wings with the basal half glossed with blue, and with two slender dusky brown marginal lines. Hindwing of male with an elongate *glandular patch of black scales* on the submedian vein near its end, which is overlapped with inwardly projected black hairs arising from a longitudinal fold contiguous to the vein, the hairs also extending along the fold towards its base. Underside. Both wings with the basal half dull brown, the outer half pale virescent-brown. *Forewing* crossed by an outer discal very narrow brown wavy band, and two slender marginal lines. *Hindwing* crossed by a broader angulated brown discal band, which is incurved and narrowest before the upper ocellus, and in the male is posteriorly merged with the brown basal area; beyond are five ocelli, the upper one and the two lowest being large and of almost equal size, the second and third much smaller, each with a black centre and small white pupil, an ochreous ring and then a dark brown ring; two marginal brown lunular lines.

Expanse, ♂ ♀ $3\frac{1}{2}$ inches.

HABITAT.—East India.

Two males and one female of this species in the late Dr. Boisduval's collection, now in possession of Mons. C. Oberthür, of Rennes, France, and a female in the Hewitson Collection at the British Museum, are all that is at present known to us. The precise locality it inhabits is unknown.

The illustration of this species, on our plate No. 75, fig. 2, represents the underside of the male of the type specimen, in the Boisduvalian Collection, reproduced from a coloured drawing kindly forwarded to us by Mons. C. Oberthür, the possessor of the late Dr. Boisduval's collection.

CÆLITES ADAMSONI (Plate 75, fig. 1, 1a, ♂ ♀).

IMAGO.—Male and female. Upperside purpurescent greyish-brown, the basal two-thirds dusky and brilliantly glossed with dark purplish ultramarine-blue; both wings with two slender blackish marginal lines; cilia purplish-cinereous. *Male* with an

elongate glandular patch of black scales on the submedian vein near its end, the patch overlapped with inwardly projected fine black hairs arising from a longitudinal fold contiguous to the vein, the hairs also extending along the fold towards its base. Underside paler, the basal two-thirds purplish olivescence-brown; both wings with the two dark brown slender marginal lines as on upperside. *Forewing* with an outer discal transverse slender dark brown sinuous line, which is narrowly bordered interiorly by the pale purplish-grey colour of the outer border. *Hindwing* with a transverse discal narrow dark brown recurved band, which is very narrowly bordered interiorly by pale purplish-grey; a submarginal series of five very prominent black ocelli, the upper one and the fourth and fifth being large and of nearly equal size, the lowest being slightly the largest; these ocelli in the female somewhat larger, the upper second and third are small, and each with a distinct white pupil, an ochreous ring, then a brown ring, and all encompassed by the pale purplish-grey of the outer border; the outer marginal line being slightly ochreous bordered. *Body* brown; legs beneath and sides of palpi pale brownish ochreous; antennæ ochreous.

Expanse, ♂ $2\frac{5}{8}$, ♀ $2\frac{6}{8}$ inches.

HABITAT.—Bhamo, Burma.

This species is smaller than *C. Nothis*. Upperside with the marginal lines more distinct. Underside of a somewhat darker brown colour, the outer borders more narrowly paler purplish-grey brown. *Forewing* with the discal line distinctly defined, narrower, and more wavy, the two marginal lines also strongly defined. The *hindwing* has the recurved discal dark brown line narrow, well defined, and narrowly bordered interiorly with purplish-grey, the two marginal lines are also strongly defined, the five ocelli more prominent, the upper second and third being also larger, and the outer bordering purplish-grey more vivid.

Major C. H. E. Adamson records (Catal. of Butterflies collected in Burma, p. 6), under the name of *C. Nothis*, the capture of several "specimens of this very rare insect in the district of Bhamo, in September and October, in dense rattan jungle, being a shade-loving insect, and is always in damp, dark, and dismal jungles."

The illustrations of this species on our plate No. 75, figs. 1, 1a, represent the male and female, kindly lent from Major Adamson's collection.

CÆLITES BINGHAMI (Plate 75, fig. 3, 3a, ♂).

Cælitæ Epiminthia, De Nicéville, Butt. of India, i. p. 101, pl. 13, fig. 31, ♂ (1883). *Nec Westwood*.

IMAGO.—Male. Upperside dusky purpurescent greyish-brown, the area of the forewing from below the subcostal to near the apex, and the hindwing from near the submedian vein, glossed with dark ultramarine-blue. Both wings with a slender blackish single marginal line; cilia bluish-cinereous. *Forewing* with an ill-defined

short narrow excurved transverse pale bluish-grey fascia before the apex. *Hindwing* with a prominent *elongate glandular patch of black scales on the submedian vein* near the end, the patch overlapped by several longish black hairs, which project inward from a longitudinal fold between the lower median and submedian vein, similar hairs also extending upward along the fold to near the base of the vein. Underside dark umber-brown. Both wings crossed by a uniformly broad glossy bluish-grey straight discal fascia, and an outer marginal fascia, the latter traversed by the two dark brown slender marginal lines, the fasciæ on the forewing being partly confluent towards the apex. *Hindwing* with five prominent ocelli, which are somewhat small and of nearly equal size, each with small black centre, a pure white narrow pupil, an ochreous ring, and then a dark brown ring, all being encompassed in the pale bluish-grey border.

Female. Upperside as in the male, except that the forewing has a more conspicuous bluish-grey excurved subapical fascia, and in the hindwing the marginal bluish-grey band extends beyond the marginal lines, the third ocellus being also decidedly the smallest. Body beneath, legs, and sides of palpi pale brownish-ochreous; antennæ ochreous.

Expanse, ♂ $2\frac{3}{4}$, ♀ 3 inches.

HABITAT.—Upper Tenasserim.

From typical *C. Epiminthia* (Bornean, Sumatran, and Malay Peninsula examples) this species is distinguishable in having more even outer margins and less angular hindwing, the forewing of the male being somewhat narrower at the apex. On the underside the transverse discal fascia crossing both wings is broader and straight, being very similar to that in *C. Euptychioides* and *C. humilis*, and not bent inward in crossing the hindwing, as in *C. Epiminthia*; the ocelli on the hindwing are totally different, those in *C. Epiminthia* being much larger and composed only of an ochreous-brown centre, a narrow white pupil, and an outer black ring.

DISTRIBUTION.—Major C. H. E. Adamson (Catal. of Burmese Butterflies, p. 6) obtained males of this species near Tounggya, Seckkan, in April, 1888, and others near Rannee in October, in the neighbourhood of Moulmain, "in thick moist rattan jungle." Capt. C. J. Bingham "took a single female in the Mepley Valley, in Upper Tenasserim, in October" (Butt. India, 102).

The illustrations of this species on our Plate No. 75, figs. 3, 3a, represent the male, kindly lent from Major Adamson's collection. An example of this species being also in the possession of Mr. H. Grose-Smith.

INDO-MALAYAN ALLIED CÆLITES.—*C. Epiminthia*, Westwood in Doubleday and Hewitson's Gen. D. Lep. p. 368 (1851). Distant, Rhop. Malay. p. 415, pl. xix. fig. 8 (1886). *Habitat.* Borneo, Sumatra, Salangore, Malay Peninsula.—*C. Euptychioides*, Felder, Reise Nov. Lep. iii. p. 499 (1867). Staudinger, Exot. Schmett. p. 223, pl. 79. *Habitat.* Borneo.—*C. humilis*, Butler, Ann. Nat. Hist. 1867, p. 403, pl. 8, fig.

8, pl. 9, fig. 2. Distant, Rhop. Malay. p. 45, fig. 15, ♂ (1882). *Habitat.* Malay Peninsula.

Genus RANGBIA.

Lethe (group *I*, part), Marshall and de Nicéville, Butt. of India, etc. i. p. 138 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 308.

IMAGO.—Male. *Forewing* short, subtriangular; costa slightly arched, apex obtusely pointed, exterior margin slightly oblique, even; costal vein perceptibly swollen, median and submedian scarcely swollen; cell extending to fully half the wing, broad; first and second subcostal branches emitted before end of the cell; discocellulars outwardly-oblique, radials from the angles near upper end; middle median branch emitted at one-fourth and lower branch at one-half before end of the cell; submedian straight; a long narrow glandular patch of lustreless scales extending along both sides of the middle of the submedian vein. *Hindwing* short, broad, bluntly ovate; costal margin rather long, exterior margin slightly scalloped and angular in the middle; anal angle rounded; cell rather long and broad; first subcostal branch emitted at one-fourth before end of the cell; discocellulars outwardly-oblique, radial from the middle; the middle median emitted at a short distance before end of the cell; a conspicuous tuft of long hairs overlapping a glandular patch of lustreless scales at base of the middle median veinlet. *Body* short; thorax robust, hairy; palpi porrect, slender, compressed, hairy in front; legs moderately short, stout; antennæ rather short, with a moderately thickened club; eyes hairy.

Type.—R. Scanda.

RANGBIA SCANDA (Plate 75, fig. 4, 4a, b, ♂ ♀).

Debis Scanda, Moore, Catal. Lep. Mus. E. I. Comp. i. p. 218 (1857), ♂.

Lethe Scanda, Butler, Catal. Satyr. Brit. Mus. p. 117 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 139 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 308. Staudinger, Exot. Schmett. p. 221, pl. 78, ♂.

Debis Nada, Moore, Catal. Lep. Mus. E. I. C. i. p. 218 (1857), ♀.

Zophoessa Dirphia,* Druce, Cistula Ent. i. p. 357 (1875), ♀. Marshall and de Nicéville, Butt. of India, etc. i. p. 163 (1883), ♀.

IMAGO.—Male. Upperside purpurescent blue-black, the outer borders glossy greyish-blue, which latter tint is most strongly defined on the forewing, where it forms a definite sinuous-bordered fascia, the fascia being palest at its upper end; abdominal margin purpurescent-brown; cilia white, alternated on the hindwing posteriorly with brown; *Forewing* with a long narrow glandular patch of lustreless scales extending along both sides of the middle of the submedian vein. *Hindwing* with a very indistinct small subapical and two lower median pale-bordered black

* Verified by actual comparison with the type specimen, now in the collection of Mr. F. D. Godman.

ocelli, each with a white pupil; a conspicuous *tuft of long black hairs* overlapping a *glandular patch of lustreless scales* at base of the middle median veinlet. Underside dark ferruginous, palest and sometimes olivescence-tinged basally; exterior margins yellowish and traversed by a blackish submarginal line. *Forewing* crossed by a darker ferruginous subbasal angular line and a contiguous short line within the cell, with an intervening yellow bar; a transverse discal slightly sinuous narrow yellow band, beyond which is a linear series of four pale ocelli, and above these ocelli is a slight sinuous costal spot. *Hindwing* crossed by a straight subbasal and a wavy discal dark ferruginous line, the latter being yellowish bordered externally; beyond is a curved series of six prominent ocelli, each with a silvery-blue outer ring, the lowest ocellus being bi-pupilled. Female. Upperside dark olivaceous ochreous-brown. *Forewing* crossed by an outwardly-oblique discal ill-defined very narrow pale ochreous-brown band, which is most distinct at its costal end; beyond are three linearly-disposed pale-bordered black subapical spots, and above these is a yellow sinuous costal spot. *Hindwing* with four ill-defined pale brownish-bordered blackish ocelli. Underside of the same colour and markings as in the male, except that the oblique discal band on forewing is broader and brighter coloured. *Body* above blackish; thorax and head clothed with varied glossy green and reddish hairs; thorax and abdomen beneath, and sides of palpi pale ferruginous; antennæ blackish, tip with red.

Expanse, ♂ $2\frac{2}{8}$ to $2\frac{4}{8}$, ♀ $2\frac{2}{8}$ to $2\frac{5}{8}$ inches.

HABITAT.—Sikkim; Bhotan.

DISTRIBUTION.—According to Mr. de Nicéville (Butt. Ind. i. 139), "this is a rare insect in Sikkim, where it has been taken by Mr. O. Möller in September." "Mr. Möller also took a single female in perfect condition in Birch Hill Park, Darjiling, at 6000 feet elevation" (J. A. S. Beng. 1885, pt. ii. p. 2). It has also been taken at Rikisum, at 7000 feet elevation in Bhotan, in August. Mr. Elwes (Tr. Ent. Soc. 1888, 311) says, "This species is not uncommon, in Sikkim, in the dense virgin forest on Tendong, and near Rikisum, and rarer on the flanks of Sinchul from 6000 to 8000 feet, in the months of July and August. I have, however, taken a single female at the end of June, but this sex is always rare, and flies but little." It was also obtained at Darjiling by the late Mr. W. S. Atkinson.

RANGBIA BHAIKAVA (Plate 76, fig. 1, la, b, ♂ ♀).

Debis Bhairava, Moore, Catal. Lep. Mus. E. I. Co. i. p. 217 (1857), ♀.

Lethe Bhairava, Butler, Catal. Satyr. Brit. Mus. p. 117 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 139 (1883). Elwes, Trans. Ent. Soc. Lond. 1883, p. 308, 309.

Debis Anysis, Hewitson, Exotic Butterflies, iii. p. 73, *Debis*, pl. 1, fig. 1 (1862), ♂.

IMAGO.—Male. Upperside dark rufescent olivaceous-brown; cilia brownish-vol. I. January 1st, 1892. n h

cinereous. *Forewing* with a transverse oblique discal dusky-brown narrow fascia and four linearly-disposed ill-defined small subapical ochreous-yellow spots; a *large glandular patch of lustreless black scales* situated above and below the middle of the submedian vein. *Hindwing* with a curved series of four ill-defined black ocelli, each with a pale reddish-brown outer ring, the two lower only showing a minute white pupil; a *large glandular patch of black lustreless scales* occupying the upper discal area, and a prominent *black recumbent tuft of hairs* overlapping a *glandular patch of black scales* at base of the middle median veinlet. Underside ferruginous; marginal lines dark ferruginous-brown. *Forewing* crossed by two outwardly-oblique subbasal dark ferruginous lines, the outer line crossing the cell only, and a discal similar line, the latter sometimes showing two or three indistinct white dentate spots along its outer edge; beyond are four ill-defined pale-ringed ocelli encompassed by a dark ferruginous outer border. *Hindwing* crossed by a sinuous subbasal and a wavy discal dark ferruginous-red line, and a series of six prominent black ocelli, each with pale ring and white pupil, the upper ocellus being placed close to the upper end of the discal line and wide apart from the others, the lower five ocelli being encompassed by a dark ferruginous outer border.

Female. Upperside somewhat paler than in male. *Forewing* with a series of white dentate spots externally bordering the oblique dusky discal fascia, these spots being disposed between the veins, the two between the medians the most prominent, the others ill-defined; subapical ochreous spots less defined, the three lower with minute black pupil. *Hindwing* with the four ocelli as in male. Underside as in male, except that on the forewing the white dentate spots bordering the discal line are distinctly defined. *Body* and legs beneath, and sides of palpi pale ferruginous.

Expanse, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

HABITAT.—Sikkim; Bhotan; Naga Hills.

DISTRIBUTION.—“A rare insect in Sikkim, which I have only taken at the Rangbi bridge in May, and on the flanks of Dhumson, in British Bhotan, at 6000 feet, in August. Mr. Müller's collectors have taken it in June, and near Buxa in Bhotan at 5000 feet in June.” (Elwes, Tr. Ent. Soc. 1888, 311.) It was also taken at Darjiling by the late Mr. W. S. Atkinson. Mr. W. Doherty obtained it in the Naga Hills, at 5000 to 8000 feet in July and August.

RANGBIA GULNIHAL (Plate 76, fig. 2, ♂).

Lethe Gulnihâl, de Nicéville, Proc. Zool. Soc. Lond. 1887, p. 450, pl. 39, fig. 7, ♂. Elwes, Trans. Ent. Soc. Lond. 1888, p. 308.

IMAGO.—Male upperside dark vinous ochreous-brown; cilia cinereous-brown. *Forewing* with the posterior margin convex and fringed, and crossed by a very indistinct dusky-black slender discal band, which is sinuously diffused at its costal end; a

large glandular patch of lustreless dusky-black scales situated slightly above and broadly beneath the middle of the submedian, on both the upper and underside of the wing. Hindwing with a series of four very indistinct slightly pale-bordered black ocelli; a large oval subcostal glandular patch of lustrous blackish scales, and a recumbent tuft of black hairs overlapping a glandular patch of blackish scales at base of the middle median veinlet. Underside pale olivaceous ochreous-brown; marginal lunular lines paler. Forewing with two transverse dark reddish-brown lines crossing the cell with a shorter line below them, and a curved wavy discal line, the latter incurved at the costal end; a series of five ill-defined pale-ringed ocelli, the upper ocellus being incompletely developed, and all encompassed by a dark brown outer border. Hindwing crossed by a dark reddish-brown angular subbasal line and a wavy discal line; beyond which are six prominent black ocelli, each composed of a black centre with a white pupil, a yellow and then a black, and lastly a pale violet outer ring, the upper ocellus largest and placed near the discal line, the lowest being duplex. Body and legs beneath, and sides of palpi pale ochreous-brown. Female unknown.

Expanse, ♂ $2\frac{1}{4}$ inches.

HABITAT.—Bhotan.

DISTRIBUTION.—“Males of this species were obtained in Bhotan by the native collectors of Messrs. O. Möller and A. V. Knyvett.” (De Nicéville, l. c. 451.)

The illustration of this species on our Plate No. 76, fig. 2, is taken from the type specimen of the male, kindly lent for this purpose by Mr. L. de Nicéville.

RANGBIA PEGUANA.

Lethe Gulnihal, var. Elwes, Proc. Zool. Soc. 1891, p. 263.

Male. Differs from typical Bhotanese *Gulnihal* in the forewing being comparatively more convex at the apex, the exterior margin slightly concave, a longer and less convex posterior margin; the glandular patches similar, but the black tuft of hairs on hindwing somewhat broader. Upperside purpurescent-brown. Underside much brighter coloured and ochreous in tint; the transverse cell streak on the forewing, and the subbasal and discal line on both wings brighter red, more irregular in their course, especially those on the hindwing, and sinuous; the ocelli on the forewing are incurved (not linearly disposed as in *Gulnihal*), are also larger in size but less defined; the ocelli on the hindwing are also much smaller (being half the size of those in *Gulnihal*) and with much less developed outer rings.

Expanse, $2\frac{3}{4}$ inches.

HABITAT.—E. Pegu, Burma.

The female of *R. Peguana*, according to Mr. Elwes (l. c. 263), “is much paler on both surfaces than the male, and has the costa of the forewing, a spot near the apex, and a faintly marked patch below it, of a lighter brownish-yellow,

with a whitish spot on the first median interspace; the hind margin of the wing not bowed as in the male; the ocelli of the hindwing showing on the upper surface, and the transverse lines of the underside are wider apart and much fainter. The ocelli are also smaller and nearly obsolete on the forewing."

DISTRIBUTION.—"Found not uncommonly by Mr. W. Doherty, at from 2000 to 5000 feet in the Karen Hills. A single specimen was also taken by Dr. Manders in the Shan Hills" (Elwes, l. c. 263). Dr. N. Manders (Tr. Ent. Soc. 1890, 518) records "three specimens of the male taken at the Hill station of Bernardmyo, at 7000 feet, in the Shan States."

RANGBIA LATIARIS (Plate 76, fig. 3, 3a, b, ♂ ♀.)

Debis latiaris, Hewitson, Exotic Butt. iii. *Debis*, pl. 1, fig. 4 (1862), ♂.

Lethe latiaris, Butler, Catal. Satyr. Brit. Mus. p. 117 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 140 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 308, 312.

IMAGO.—Male. Upperside olivaceous ochreous-brown; cilia pale cinereous-brown. *Forewing* with a *slightly developed glandular patch* of dusky scales on the submedian vein. *Hindwing* with the five ocelli of the underside slightly visible; marginal lines pale bordered; with a prominent *tuft of recumbent black hairs* overlapping a *glandular patch of scales* at base of middle median veinlet. Underside pale olivaceous-brown; marginal lines dark brown and ochreous bordered. *Forewing* crossed by a dark reddish-brown straight subbasal line, a shorter line within the cell, and a discal line, the latter slightly bordered externally with lilacine; beyond is a series of four very palely-defined ocelli laterally bordered by a brown shade. *Hindwing* crossed by a straight subbasal dark reddish-brown line, a biangulated discal line, and an outer series of six ocelli each with white-speckled black centre and outer lilacine-grey ring, the anal ocellus duplex; inner marginal line bordered with lilacine-grey.

Female. *Forewing* less triangular; crossed by an outwardly-oblique discal very indistinct pale ochreous-brown narrow band, and a short subapical similar oblique line. *Hindwing* more angulate at end of the upper median; with four median and an apical ill-defined blind blackish ocelli. Underside pale olivaceous-brown, marked as in the male, except that the discal transverse line of the *forewing* is somewhat more oblique and has a pale yellowish outer bordering-fascia. *Hindwing* with the discal line angulated on each median vein, the ocelli much more prominent. *Body* and legs beneath, and sides of palpi pale ochreous.

Expanse, ♂ 2 $\frac{3}{8}$, ♀ 2 $\frac{7}{8}$ inches.

HABITAT.—Sikkim, Assam, Silhet, Khasias, Upper Tenasserim.

DISTRIBUTION.—"Sikkim, 4-5000 feet, through Assam to Tenasserim." (Elwes Tr. Ent. Soc. 1888, 308.) "A rare or local species in Sikkim, but, according to

Mr. O. Möller, found in April and May, and again in October, at 2-5000 feet on the Tukvar Spur. My collectors brought a single female from the interior in 1883, which must, I think, have been taken at a higher elevation." (Elwes, *id.* p. 312.) "Somewhat rare. It has been taken at Shillong in May" (de Nicéville, Butt. Ind. i. 140). It was taken at Cherra Punji by the late Mr. W. S. Atkinson, and by Dr. G. Watt (Ann. Nat. Hist. 1885, 301) on the borders of Assam. It is not uncommon in the Khasia Hills.

The illustrations on our Plate No. 76, fig. 3, 3a, b, represent the male and female, the latter sex taken from a specimen kindly lent for this purpose by Mr. H. J. Elwes.

Genus NEMETIS.

Temenis (part), Hübner, Verz. bek. Schmett. p. 34 (1816).

Debis (part), Westwood, Gen. D. Lep. p. 358 (1851).

Lethe (group I., part), Marshall and de Nicéville, Butt. of India, etc. i. p. 158 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 308.

IMAGO.—Male. *Forewing* triangular; costa much arched, apex rounded, exterior margin oblique and slightly concave in the middle, posterior margin slightly convex and fringed; the basal area with numerous fine short recumbent hairs projecting outwardly above the ordinary scales; costal vein swollen; submedian vein much recurved; with a prominent *recumbent patch of hairs* overlapping a narrow *glandular patch of scales* situated below the middle of the submedian vein. *Hindwing* with a prominent *recumbent tuft of long hairs* overlapping a *glandular patch of scales* between the base of the middle and lower median veinlets; cell long; discocellulars very oblique. Antennal club slender.

Type.—N. Minerva.

NEMETIS MINERVA (Plate 77, fig. 1, 1a, b, ♂ ♀).

Papilio Minerva, Fabricius, Syst. Ent. p. 493, ♀ (1775); Spec. Ins. p. 74 (1791); Mant. Ins. p. 37 (1787); Ent. Syst. iii. p. 95 (1793).

Lethe Minerva, Butler, Catal. Fabrician Lep. Brit. Mus. p. 29 (1869). Marshall and de Nicéville, Butt. of India, etc. i. p. 140 (1883). Distant, Rhop. Malayana, p. 414, pl. 36, fig. 8, ♂.

Satyrus Minerva, Godart, Enc. Méth. ix. p. 499 (1818). Westwood, Gen. D. Lep. p. 392.

Papilio Arcadia, Cramer, Pap. Exot. ii. pl. 116, fig. E, F (1779), ♀.

Temenis Arcadia, Hübner, Verz. bek. Schmett. p. 34 (1816).

The following is an allied Chinese form: gen. nov. *Kirrodessa*. Male. *Forewing* triangular, narrow; glandular patch absent. *Hindwing* ovate, exterior margin slightly scalloped; with a *tuft of hairs arising within the upper base of the cell* and overlapping a subcostal glandular patch of scales, and a *second tuft also arising within the cell* and overlapping a narrow lower-discocellular glandular patch of scales. Type *K. Sicelis* (Hewitson, Exot. Butt. *Debis*, pl. i. fig. 3 (1862). *Habitat*. China, Japan.

Debis Arcadia, Westwood, Gen. D. Lep. p. 359 (1851). Moore, Catal. Lep. Mus. E. I. C. i. p. 219 (1857).

Lethe Arcadia, Butler, Catal. Satyr. Brit. Mus. p. 118 (1868).

Satyrus Caumas, Godart, Enc. Méth. ix. p. 479 (1819), ♂ ♀.

IMAGO.—Male. Upperside. *Forewing* reddish olivescens-brown, the basal half with numerous outwardly recumbent fine reddish-ochreous hairs, and a *prominent tuft* of similar hairs overlapping a *glandular patch of ochreous scales* below the middle of the submedian vein, the patch being broadly encompassed by an area of black scales. *Hindwing* with the basal half reddish olivescens-brown, the posterior half reddish-ferruginous; marginal lines brown; with a curved discal series of five more or less defined black spots, and a prominent *recumbent tuft of blackish-tipt hairs* overlapping a *glandular patch of scales* between the base of middle and lower median veinlets. Underside pale dull brownish-ochreous; marginal lines slender, black. *Forewing* crossed by a reddish-brown inwardly-oblique subbasal line, a short inner streak and a dot above it within the cell, and a discal angulated line, the latter broadly pale bordered externally; beyond is a row of very ill-defined pale-bordered brownish ocelli with minute black pupils. *Hindwing* with a straight reddish-brown subbasal line, and a zigzag discal line, the latter broadly pale-bordered externally; beyond is a curved series of six indistinct brownish-ochreous ocelli, each with a black centre sprinkled with ochreous-white scales.

Female. Upperside reddish-ferruginous, the apical half of forewing being reddish olivescens-brown. *Forewing* with an angular macular white discal band composed of four portions, the upper portion being long and extending obliquely inward to the costa, the three lower parts triangular in shape and disposed transversely, the middle part being the smallest; beyond are two small conjoined white apical spots. *Hindwing* with two large outwardly-quadrate apical black spots and three lower discal small oval spots. Underside as in the male, except that on the forewing the discal line is outwardly angular and bordered externally by the whitish spots as on the upperside. *Body* and legs beneath, and sides of palpi pale ochreous.

Expanse, $2\frac{3}{8}$ to $2\frac{5}{8}$ inches.

HABITAT.—Burma; Tenasserim; Malay Peninsula; Sumatra, Java.

DISTRIBUTION.—“This species has been taken in Upper Tenasserim by Capt. C. T. Bingham, in the Donat Range in January, in the Mepley Valley in January and February, and in the Thoungyeen forests in March and May.” It has also been taken at Houndraw in November (de Nicéville, Butt. Ind. 141). Mr. O. Limborg (P. Z. S. 1878, p. 824) obtained it at Ahsown in the cold weather. Messrs. Elwes and de Nicéville (J. A. S. Beng. 1887, 417) record it from Tavoy. Major C. H. E. Adamson (Catal. Butt. coll. in Burma, p. 7) records it as being “sparsely spread throughout Burma.”

DISTRIBUTION OUTSIDE INDIAN AREA.—In the Malay Peninsula, it has been taken at Perak. It also occurs in Sumatra, and was taken by Dr. Horsfield in Java; the specimens from these latter localities being much more brightly coloured beneath than those from Tenasserim.

Genus HANIPHA.

Hanipha, Moore, Lep. of Ceylon, i. p. 18 (1880).

Lethe (group I. part), Marshall and de Nicéville, Butt. of India, etc. i. p. 139 (1883).

IMAGO.—Wings very short, broad. *Forewing* triangular, costa much arched, apex obtusely pointed, exterior margin slightly concave, posterior angle convex, posterior margin straight. *Hindwing* with a prominent broad extended caudate point at end of the upper median veinlet. *Male* with a conspicuous lengthened recumbent tuft of hairs transversely overlapping a sericeous glandular patch of scales situated between the lower median and submedian veins; lower median very much curved. Antennal club short and stout.

Type.—H. Dynsate.

HANIPHA DYNSTATE (Plate 77, fig. 2, 2a, b, ♂ ♀).

Debis Dynsate, Hewitson, Exotic Butt. iii. p. 76, *Debis*, pl. 2, fig. 9, 10 (1863), ♀,

Hanipha Dynsate, Moore, Lep. of Ceylon, i. p. 20, pl. 9, fig. 1, 1a (1880), ♀.

Lethe Dynsate, Butler, Catal. Satyr. Brit. Mus. p. 115 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 142 (1883), ♀.

Lethe Sihala, Moore, Proc. Zool. Soc. Lond. 1872, p. 555. Marshall and de Nicéville, Butt. of India, etc. i. p. 141 (1883).

Hanipha Sihala, Moore, Lep. of Ceylon, i. p. 19, pl. 8, fig. 2, a, b (1880).

IMAGO.—Male. Upperside dark olive-brown, glossy; cilia cinereous-brown. *Forewing* with two, or three, very indistinct small pale ochreous apical spots, and a faint indication of a blackish oblique discal fascia with pale outer border; a prominent longitudinal tuft of long blackish-brown recumbent hairs overlapping a glandular sericeous patch of scales situated between the lower median and submedian veins. *Hindwing* with a series of five indistinct black spots; marginal lines blackish. Underside olivescens-brown, the basal half very dark brown; marginal lines dark brown. *Forewing* with a short pale purple-bordered brown subbasal line, an outwardly-oblique transverse discal chalybeate-purple fascia, and a series of five small pale ocelli, each with a similar coloured outer ring and a black dot in the centre. *Hindwing* with a sinuous subbasal purple-bordered brown line, and a dark brown discal line, which latter is acutely angulated between the upper median and radial, beyond which are six prominent black ocelli with white-speckled pupils, the

upper and the fifth being the most prominent and more circular than the others, all with a chalybeate outer ring; inner marginal line also chalybeate bordered. *Body* beneath dark brown; legs beneath and sides of palpi pale cinereous-brown; antennæ bright ochreous, club with black band.

Female. Upperside pale olivescient ochreous-brown. *Forewing* with a broad oblique discal white band, and a contiguous terminal spot near posterior angle; two, or three, small white apical spots, and two, or, three, indistinct black lower ocellate spots; a pale ochreous streak above the posterior margin. *Hindwing* with an angulated discal brown line with irregular yellowish outer border; two upper apical and three median black spots, the two former irregularly quadrate and confluent, the others rounded, the middle one being very small, the two lower with a white central dot, all being irregularly yellowish bordered; marginal lines brown and yellowish bordered. Underside paler; the base and outer borders palest. *Forewing* with a pale bordered subbasal line, white oblique discal band, and four, sometimes five ill-defined pale-bordered ocelli. *Hindwing* with a sinuous subbasal line, an angular discal line with irregular yellow outer border, and six ocelli as in male, with brown and yellowish outer borders. *Body* and legs beneath, and sides of palpi pale ochreous.

Expanse, ♂ $2\frac{2}{3}$ to $2\frac{3}{4}$, ♀ $2\frac{2}{3}$ to $2\frac{5}{8}$ inches.

HABITAT.—Ceylon.

DISTRIBUTION.—“Rare and very local. Observed only in two places in forest land near Newera Eliya; March and April” (Hutchison). Mr. F. M. Mackwood, in his MS. notes, remarks that this species is the rarest of the group, in Ceylon. Mr. E. Ernest Green notes its capture at Pundaloya in July.

Genus DEBIS.

Debis, Doubleday and Hewitson, Gen. Diurnal Lep. pl. 61, fig. 3 (1849). Westwood, *id.* p. 358 (1851). Scudder, Amer. Acad. Arts and Sci. Boston, 1875, p. 155.

Lethe (group II., part), Marshall and de Nicéville, Butt. of India, etc. i. p. 143 (1883).

IMAGO.—Male. *Forewing* subtriangular, narrow; costa much arched, apex abruptly rounded, exterior margin very oblique and slightly concave; posterior margin short; basal half hairy; a very indistinctly-defined broad inwardly-oblique discal *dusky fascia*, composed of glandular scales extending from the subcostal to the posterior margin; costal vein swollen, median and submedian very slightly swollen; cell broad; first and second subcostal branches emitted before end of the cell; discocellulars oblique, slightly incurved, both radials close to upper end; median branches equidistant; submedian nearly straight. *Hindwing* short; costa convex at the base, exterior margin slightly scalloped and with a prolonged broad caudate angle at end of upper median, anal angle excavated; basal area hairy; cell rather long, much pointed at end; discocellulars very oblique, long, bent in the middle;

two upper medians from extreme end of the cell; submedian and internal vein curved. *Body* rather slender; palpi ascending, slender, compressed; antennæ with a moderately thick club; eyes coarsely hairy.

Type.—D. Samio.

DEBIS KANSA (Plate 78, fig. 1, 1a, b, ♂ ♀).

Debis Kansa, Moore, Catal. Lep. Mus. E. I. Company, i. p. 220 (1857).

Lethe Kansa, Butler, Catal. Satyr. Brit. Mus. p. 119 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 145 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 308. Staudinger, Exot. Schmett. p. 221, pl. 78, ♂.

IMAGO.—Male. Upperside olivescient ochreous-brown. *Forewing* with a distinctly visible broad, dusky transverse *discal fascia clothed with glandular scales*, these scales being short, more or less broad, ribbed, and having dentated tips, with numerous interspersed narrow truncate-base bulbous androconia having short hair-like end and penicillate tip, and interspersing moderately long fine hairs; beyond which is a very indistinctly-defined small pale apical spot and two similar lower subapical spots. *Hindwing* with an outer series of five black spots, each with a narrow ochreous-yellow outer ring, the third and lower fifth spot being small, the ordinary sixth or anal spot not present; marginal lines pale bordered. Underside paler, and of a uniform vinaceous tint, slightly washed with lilacine chalybeate-white; crossed by a slender dark purple-red subbasal and a discal line, the latter on the hindwing slightly irregular; marginal lines pale bordered. *Forewing* with four pale ochreous-brown ocelli. *Hindwing* with six small-sized ocelli, each with a lilacine outer ring; the marginal line inwardly bordered with lilacine and ending in a prominent triangular anal spot.

Female. Upperside slightly paler. *Forewing* with a distinct transverse discal dusky sinuous line externally bordered by two or three sinuous pale ochreous decreasing spots from its anterior end; beyond is a small pale ochreous subapical spot and two lower spots. *Hindwing* as in the male. Underside paler than in the male; markings the same, except that the forewing has six palely-defined small ocelli. *Body* and legs beneath, and sides of the palpi brownish-ochreous.

Expanse, ♂ $2\frac{3}{4}$ to 3, ♀ $2\frac{5}{8}$ inches.

HABITAT.—Sikkim; Sibsagar, Manipur; Upper Tenasserim.

DISTRIBUTION.—"A fairly common species in Sikkim at 2000 to 4000 feet, and also taken up to 9000 feet between April and October." (Elwes, Tr. Ent. Soc. 1888, 312.) Messrs. Otto Möller and L. de Nicéville have taken both sexes of this species in the Sikkim Hills at low elevations in October. It was also taken at Darjiling by the late Mr. W. S. Atkinson. Mr. A. O. Hume took it in the eastern hills of Manipur in May, and Capt. C. T. Bingham obtained it in the Thoungyeen forests, Upper Tenasserim, in March (De Nicéville, Butt. India, 145).

DEBIS SAMIO (Plate 78, fig. 2, 2a, ♂ ♀).

Debis Samio, Doubleday and Hewitson, Gen. D. Lep. pl. 61, fig. 3 (1849), ♂. Westwood, *id.* p. 360 (1851), ♂.

Lethe Samio, Butler, Catal. Satyr. Brit. Mus. p. 118 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 145 (1883), ♂.

Debis Purana, Felder, Wien. Ent. Monat. iii. p. 401 (1859), ♀.

Lethe Purana, Butler, Catal. Satyr. Brit. Mus. p. 118 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 146, ♀.

IMAGO.—Male. Upperside olivescient ochreous-brown. *Forewing* without markings, but crossed by a very indistinctly-defined broad inwardly-oblique discal dusky fascia composed of glandular scales. *Hindwing* with six submarginal black spots, of which the upper third and the lowest are minute, the second the largest, and each bordered by a pale reddish-ochreous outer ring, the border of the upper three being broadly confluent. Underside paler and of a reddish tint; both wings with a slender lilacine outer bordered subbasal and a discal transverse red-brown line, the latter, on the hindwing, being incurved anteriorly and much angulated between the upper median and the radial. *Forewing* with four pale ocelli, each with a lilacine outer ring. *Hindwing* with six prominent ocelli, the sixth duplex, each with a lilacine outer ring; a lilacine spot at anal angle.

Female. Upperside paler, more olivescient-ochreous in tint. *Forewing* crossed by an oblique discal decreasing, almost macular, white fascia, which is diffused externally; beyond is an adjacent obsolescent white spot between the upper and middle median veinlets. *Hindwing* crossed by a dusky-brown discal line, which is angulated outward just above the upper median veinlet, the angle being darker brown; beyond are four large black submarginal spots broadly circled with ochreous-yellow; marginal line ochreous bordered. Underside paler olivescient ochreous-brown, palest externally; marginal lines ochreous bordered; both wings crossed by a straight subbasal darker brown line with lilacine outer border. *Forewing* also crossed by an oblique similar discal line with broader lilacine outer fascia, beyond which are four pale ochreous-bordered small ocelli. *Hindwing* also crossed by an angular discal brown line as in the male; the six ocelli also as in the male, each with an outer lilacine ring; a lilacine triangular anal spot below the lower ocellus.

Expanse, ♂ 2 $\frac{2}{3}$, ♀ 2 $\frac{1}{2}$ inches.

HABITAT.—East India.

The only specimens of this species as yet known to us are the male type of *D. Samio* in the British Museum Collection (Plate 78, fig. 2), of which no definite locality is known, other than that of "East India," and the female in Dr. Felder's Collection, described by him as *D. Purana*, but without any given locality. For the

opportunity of being able to determine these two insects as the sexes of one another, we are indebted to Dr. Rogenhofer, the Custodian of the Zoological Museum, Vienna, who has kindly favoured us with a coloured drawing of Dr. Felder's type specimen, and which we reproduce on our Plate No. 78, fig. 2a.

This species is closely allied to *D. Sinorix*, but the male is distinguishable from it, on the upperside, by the forewing not possessing the pale ochreous subapical spots, and by the hindwing having the black spots and their reddish-ochreous border more clearly defined. On the underside, the male of *D. Samio* is of a redder tint throughout; the transverse subbasal and the discal line are both narrower, less narrow than even in *D. Kansa*; on the hindwing the discal line is much outwardly-angulated in its middle, and it is also incurved much closer towards the subbasal line at its upper end than in either *D. Sinorix* or *D. Kansa*. On the forewing beneath, there are only four ocelli present in *D. Samio*. The female (*D. Purana* of Felder) differs from the same sex of *D. Sinorix*, on the upperside, in the forewing having a more defined transverse discal white band, and one—the lower—subapical spot only being present; the markings on the hindwing, however, are similar. On the underside the colour of the female is also paler, and more ochreous in tint; and on the forewing there are only four ocelli present; on the hindwing the discal line is much angulated outwardly in its middle and incurved upwards nearer to the subbasal line than in *D. Sinorix*.

DEBIS SINORIX (Plate 78, fig. 3, 3a, b, ♂ ♀).

Debix Sinorix, Hewitson, Exotic Butt. iii. *Debix* pl. 3, fig. 19, 20 (1863), ♂.

Lethe Sinorix, Butler, Catal. Satyr. Brit. Mus. p. 118 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 144 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 308.

IMAGO.—Male. Upperside glossy, dark olivescient ochreous-brown. *Forewing* with a slender very indistinct dusky-black transverse subbasal and a discal straight nearly erect line; a subapical series of three pale ochreous yellow small round spots, between the two upper of which is a smaller black spot, and another lower black spot between the middle and lower median veinlets; a slightly-apparent dusky *transverse fascia composed of glandular scales* crossing the wing before the discal line. *Hindwing* with a broad outer discal angular-bordered pale reddish-ochreous fascia, upon which are six black spots, of which the upper third and the lowest are very minute; the extreme outer margin being darker reddish-ochreous. Underside very pale olivescient-brown, the discal area and apex of forewing washed with chalybeate lilacine-white; marginal lines dark purplish-red. *Forewing* with a subbasal and a discal transverse straight dark purple-red thick line, and a dentate inner mark within the cell; beyond which is a series of six small pale spots, the upper being white, the others ocellate, the second, fifth, and sixth with black centre and white pupil, the third and fourth

ochreous-yellow, the sixth being situated between the lower median and submedian. *Hindwing* with a similar subbasal and discal line, the latter very slightly dentate above the upper median, beyond which are six small-sized ocelli, each with a lilacine-white outer ring; marginal lines bordered with lilacine-white ending in a prominent triangular anal spot.

Female. Upperside of both wings paler than in male. *Forewing* with the transverse discal dusky line externally bordered with very indistinct pale yellowish spots; outer marginal spots as in male. *Hindwing* marked as in the male. Underside slightly paler throughout than in male, markings exactly the same. Body and legs beneath, and sides of palpi pale brownish-ochreous.

Expanse, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

HABITAT.—Sikkim; Bhotan; Assam; Khasia Hills; Burma.

DISTRIBUTION.—In Sikkim, according to Mr. Elwes (Tr. Ent. Soc. 1888, 312), "this must be a very rare species, as I have only one old specimen from Wilson's Collection, and Möller has only one, which differs from Bhotan specimens in wanting the rufous margin of the hindwing. It occurs, however, more commonly near Buxa in Bhotan, where Mr. Knyvett's collectors have taken both sexes in July and August. I have taken it at Cherra Punji in the Khasia Hills, in September." It was obtained by the late Mr. W. S. Atkinson in Sikkim, and at Cherra Punji. Mr. de Nicéville (Butt. Ind. i. 144) gives Cherra Punji and Sibsagar, Assam, and the Daffa Hills, but no precise record of their capture." Our own collection contains specimens from the Khasia Hills collected by Major Godwin-Austen. In Burma, Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 518) records "one male, with rufous markings on the hindwing well marked, from Bernardmyo, a Hill Station in the Shan States at 7000 feet elevation."

DEBIS MEKARA.

WET-SEASON BROOD (Plate 79, fig. 1, 1a, b, ♂ ♀).

Debis Mekara, Moore, Catal. Lep. Mus. E. I. Compy. i. p. 219 (1857).

Lethe Mekara, Butler, Catal. Satyr. Brit. Mus. p. 119 (1868). Moore, P. Z. S. 1878, p. 824. Marshall and de Nicéville, Butt. of India, etc. i. p. 148, pl. xi. fig. 24, ♂ (1883). Distant, Rhop. Malayana, p. 413, pl. 39, fig 9, ♂ (1886). Elwes, Trans. Ent. Soc. Lond. 1888, p. 309.

IMAGO.—Male. Upperside dark glossy olivescient ochreous-brown; cilia pale cinereous-ochreous. *Forewing* with a slightly perceptible broad transverse discal dusky-brown glandular fascia. *Hindwing* with four round blackish submarginal spots, each encircled by a more or less defined narrow reddish outer ring, some specimens with the upper or apical spot of the underside being also slightly apparent. Underside paler; both wings crossed by a straight dark reddish-brown subbasal line and a similar discal line, the latter being very slightly angulated on the upper median

veinlet in the forewing and also slightly on the medians in the hindwing, both lines also broadly bordered externally with glossy lilacine pinkish-white; marginal lines dark brown, slender. *Forewing* with five, generally six, small uniformly-sized pale ocelli, each with minute black centre and a slightly perceptible white pupil, all encompassed by a lilacine outer ring. *Hindwing* with six more prominent ocelli, the upper and the fourth being rounded, the others more oval and the lowest duplex, each with a dark brown-black centre speckled with white, and with a prominent lilacine outer ring.

Female. Upperside dusky-red, apical half of the forewing, and marginal border of hindwing darker olivescence-brown; marginal lines of hindwing dark brown and interlined with ochreous. *Forewing* with an angulated, macular, white band bordering the transverse discal blackish line, and a small white apical spot, below the latter, in some specimens, are three small incipient pale ocelli. *Hindwing* with a slightly apparent transverse discal blackish angulate line, five large black submarginal spots, and sometimes a less apparent small lower spot, all more or less with a paler red outer ring, or in some their outer border is of a pale ochreous tint. Underside of the same paler colour as in male, the transverse subbasal line on both wings is straight, but the discal line on the forewing is broadly angulated outward on the upper median vein, and its costal end terminates inward nearer the subbasal line; the discal line on the hindwing is also somewhat more angulated than in the male; the discal line on the forewing has a broad lilacine-white macular outer border, and this line on the hindwing is also more or less broadly bordered externally with lilacine-white; ocelli on both wings as in the male, except that on the forewing the ocellus between the middle and upper medians is pushed slightly outward by the white dentate spot. *Body* and legs beneath, and sides of palpi pale brownish-ochreous; antennæ reddish with brown apical band.

Expanse, $2\frac{1}{2}$ to 3 inches.

DRY-SEASON BROOD (Plate 79, fig. 1, c, ♂).

IMAGO.—Male. Upperside as in the wet-season brood. Underside much paler and more uniformly coloured throughout than in the male of the wet-season brood, and more ochreous in tint; the transverse lines very slightly, or not all, bordered externally with glossy lilacine, the lilacine bordering to the ocelli also less, or entirely absent; the ocelli on both wings less defined and smaller, especially those on the hindwing.

Expanse, ♂ $2\frac{3}{4}$ inches.

HABITAT.—Sikkim; Assam; Khasia Hills; Burma; Malaya.

DISTRIBUTION.—According to Mr. Elwes (Trans. Ent. Soc. 1888, 313) this is "a common species in the low valleys and up to 5000 feet, in Sikkim, from March to

November. It frequents bamboos, and when disturbed flies into the thick foliage, where it settles on a bamboo-stem with closed wings, and is difficult to see. Like several of its congeners, it prefers shady to sunny places." Specimens from Shillong, Assam, are in Mr. P. Crowley's collection. Capt. E. Y. Watson, in his "Notes on Chin-Lushai butterflies" (Journ. Bombay Nat. Hist. Sec. 1891, 10), records it "from Tilin, in the Chin Hills, taken in May." Major C. H. E. Adamson (Catal. Butterflies collected in Burma, p. 8) states that it is "sparsely spread throughout Burma from June to August." Mr. O. Limborg (P. Z. S. 1878, 824) obtained it at Ahsown, 2000 feet, and at Taoo, 3000 to 5000 feet, in Upper Tenasserim." "Capt. C. T. Bingham took it in the Donat range, Tenasserim, in February and April" (Butt. of India, i. 148). There is a specimen of the male from Mergui, collected by Commander Carpenter, R.N., in the British Museum collection.

DISTRIBUTION OUTSIDE INDIAN AREA.—In the Malay Peninsula Mr. Distant (Rhop. Malay. 414) records it from Perak, and Malacca, where Capt. Godfrey observed it frequenting dark shady places, passing the day at the foot of a tuft of bamboo, or on low shrubs under shady trees, and when disturbed it goes off with a rapid flight, soon settling again, however, unless it has been several times alarmed." A specimen from Salanga Island is in the British Museum. A male in our own collection, from Sumatra, collected by Mr. A. R. Wallace, is undoubtedly Mekara. An example from Sarawak, Borneo, is also in the British Museum collection. This species will also probably include the Javan *D. Manthara* (Felder, Reise Novara, iii. p. 497).

Of our illustrations of this species on Plate 79, figs. 1, 1a, b, represents the male and female of the wet-season brood; and fig. 1, c, the underside of the male of the dry-season brood; all from Sikkim.

DEBIS SATYAVATI (Plate 80, fig. 2, 2a, ♀).

Lethe Satyavati, de Nicéville, Journ. Asiat. Soc. Bengal, 1880, p. 246, ♀. Marshall and de Nicéville, Butt. of India, i. p. 554 (1883), ♀.

IMAGO.—"Female. Upperside dull brown, paler towards the margins. *Forewing* with an indistinct submarginal darker line. *Hindwing* with a submarginal series of four rounded spots darker than the ground-colour, placed one in each interspace above the first median nervule; two maginal darker lines defined inwardly by paler lines than the ground-colour. Underside pale brown, with no ochreous tint, and washed with lilac, especially on the outer half. Both wings crossed by a prominent brown nearly straight subbasal line outwardly margined with lilac. *Forewing* with an irregular discal transverse brown line; a bar in the cell within the subbasal line; five indistinct submarginal ocelli circled with lilac and brown on a lilac ground; and a yellowish marginal line edged on both sides with dusky, within which is a brown waved band on the lilac ground between the ocelli and the margin.

Hindwing with a discal very much angled dark-brown line, within which is a very distinct lilac litura above the third median nervule and just beyond the apex of the cell; the submarginal ocelli large, the upper one distinctly pupilled with white, and all of them profusely speckled with white; the usual marginal markings." Male unknown.

Expanse, $2\frac{7}{10}$ inches.

HABITAT.—Sibsagar, Assam.

The male of this species is unknown. The type specimen, from which the illustrations on our Plate No. 80, fig. 2, 2a, are taken, is in the Indian Museum, Calcutta, and has been kindly lent to us for this purpose, by Prof. J. Wood-Mason.

DEBIS CHANDICA (Plate 79, fig. 2, 2a, b, ♂ ♀).

Debis Chandica, Moore, Catal. Lep. Mus. E. I. Comp. i. p. 219 (1857).

Lethe Chandica, Butler, Catal. Satyr. Brit. Mus. p. 119 (1868).

IMAGO.—Male. Upperside dusky-brown, darkest basally; cilia pale cinereous-ochreous. *Forewing* with the discal transverse glandular fascia broad and perceptibly blackish. *Hindwing* with the four, or five, submarginal blackish spots scarcely visible, in some they are more or less apparent, whilst in some Sikkim specimens taken in March, these spots are more or less distinctly red bordered. Underside pale greyish ochreous-brown, more or less purplish tinged; marginal lines prominent and ochreous bordered. Both wings with a dark red-brown angulated subbasal line, and a more irregularly-angulated discal line, the latter line on the forewing being obsolescent anteriorly, and on the hindwing much angularly projected outward on the middle median, both lines on the forewing being pale lilacine bordered externally, and the intermediate area between the lines on the hindwing ochreous towards the costa and increasingly dark brown bordering the outer angles. *Forewing* with six small almost equal-sized pale ocelli, each with a slightly-defined minute blackish centre and a scarcely visible white pupil, and outer lilacine ring. *Hindwing* with six prominent ocelli, each with a black-brown and white-speckled centre, the upper ocellus being the largest and rounded, the second reniform, the others more oval, and all encompassed by a lilacine outer border.

Female. Upperside dusky-red, the apical half of forewing and outer margin of hindwing blackish-brown. *Forewing* with an angular discal white macular band, composed of three portions, beyond which is a submarginal series of six more or less defined small black white-bordered ocellated spots. *Hindwing* with the inner marginal border and the median area blackish-brown; marginal lines prominent and ochreous bordered anteriorly; six submarginal more or less defined large ocellate spots, each with a black centre, pale reddish iris, black outer ring, and all more or less with a pale ochreous border. Underside of the

same ground-colour as in male, the prominent transverse subbasal and discal angulated line, as on upperside, also the same, but the latter line with darker brown interior border, and with a triangular dark-brown portion before the apex on the forewing; marginal lines prominent; ocelli on both wings somewhat larger than in male, and much more prominent. *Body* beneath, legs, and sides of palpi pale ochreous; antennæ ochreous with brown apical band.

Expanse, $2\frac{1}{2}$ to 3 inches.

HABITAT.—Sikkim; Assam; Khasia Hills; Burma.

DISTRIBUTION.—“Not uncommon in the lower valleys in Sikkim, where Mr. Otto Möller has taken it in May, August, and October. The late Mr. Cock took it at Shillong. It also occurs in the Khasia Hills and Silhet. Mr. A. O. Hume took it in the eastern hills in Manipur in May” (Butt. of India, 149). The late Mr. W. S. Atkinson obtained it in Cherra Punji in October. According to Mr. Elwes (Trans. Ent. Soc. 1888, 314) it is common in Sikkim at the same elevation and in the same months as *D. Mekara*, and has very similar habits.” Major C. H. E. Adamson (List of Burmese Butterflies, p. 8) records it from the Arakan Hills. Dr. N. Manders (Tr. Ent. Soc. 1890, 518) obtained it at Fort Stedman, 3200 feet, in the Shan States during the rainy season.” “Capt. C. T. Bingham took it in the Thoungyeen forests in Upper Tenasserim, in September.” Signor Leonardo Fea obtained it in the Karen Hills in September and October. A specimen of the male labelled “Sumatra,” is in the British Museum.

DEBIS DISTANS (Plate 80, fig. 1, 1a, b, ♂ ♀).

Lethe Distans, Butler, Trans. Ent. Soc. Lond. 1870, p. 448, ♂; *id.* Lep. Exotica, p. 87, pl. 33, fig. 4, 6, 7, ♂ ♀ (1872). Marshall and de Nicéville, Butt. of India, etc. i. p. 148 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, pp. 309, 313.

IMAGO.—Male. Upperside olivescens ochreous-brown. *Forewing* with faint indication of a *dusky transverse discal glandular fascia*. *Hindwing* with the outer half red, the dividing discal line angulated at the upper median veinlet; a sub-marginal series of five black spots, of which the three lower are small. Underside pale ochreous-brown, the darker shades more olivescens-brown; marginal lines dark brown; transverse subbasal and discal dark brown line narrow, the former slightly angulated, the latter on the forewing angulated on the upper and middle medians (more acutely than in *D. Chandica*), and on the hindwing acutely angulated on the upper median (but less so than in *D. Chandica*). *Forewing* with six pale ocelli. *Hindwing* with six ocelli, each with a black centre and white speckles, these ocelli are of similar shape to but smaller than those of *D. Chandica*.

Female. Upperside ferruginous-red. *Forewing* with the apical half dusky ferruginous-brown; crossed by an angular discal macular white band, composed of

three portions as in *Chandica*, but the upper portion smaller and narrower, these white spots externally bordering the dark angular discal line; beyond is a white apical spot and some very slight indications of pale lower spots. *Hindwing* with a slightly-defined discal angulated brown line, and five outer pale-ringed black spots, the two upper of which are the largest and obliquely oval in shape; marginal border brownish, marginal lines dark brown. Underside pale olivaceous ochreous-brown, the inner borders of the discal line, the triangular costal patch, and the marginal lines dark brown. *Forewing* with a dark brown slightly-angulated subbasal line, and an angular discal white macular band, as on upperside, beyond which are six pale ochreous-brown ocelli, the one between the middle and upper median being pushed outward by the dentate white spot. *Hindwing* with a slightly-angulated subbasal line, and an irregular-angulated discal line, which latter is acutely pointed and extended upon the upper median veinlet; six outer ocelli, the three upper and the lowest with black centre speckled with white, the fourth and fifth paler but similar, all are smaller and narrower than in *Chandica* and more or less reniform in shape, the upper one being somewhat the largest. *Body* beneath, legs, and sides of palpi pale ochreous.

Expanse, ♂ $2\frac{2}{3}$, ♀ $3\frac{1}{3}$ inches.

HABITAT.—Sikkim; Bhotan.

Distinguishable from *D. Chandica* in the male having on the upperside the exterior half of the hindwing red, the underside paler, the discal line on the forewing more acutely angulated on the upper and middle median, but less so on the hindwing, and on the hindwing the ocelli are all smaller, less prominently developed, but similarly shaped. In the female, the upperside is paler and brighter coloured, the macular white angular band composed of somewhat smaller portions, and the black spots on the hindwing more defined. On the underside the ground-colour is similar to that of *Mekara*, but more ochreous in tint than in *Chandica*, the subbasal line on both wings is less regular than in *Mekara* but is also less angulated than in *Chandica*, the white macular-bordered angular discal line on the forewing is more concave posteriorly than in *Mekara*, but less so than in *Chandica*, and on the hindwing the discal line is projected more outward upon the upper median than in *Mekara*, but much less so than in *Chandica*; in *Distans* these two lines on the hindwing are nearer each other than in *Mekara*, and the discal line on this wing is much less incurved at its anterior end than in *Chandica*; the ocelli on the forewing are similar to those in *Mekara*, these, in both species, being smaller than those in *Chandica*; the ocelli on the hindwing are also smaller and more regularly reniform in shape.

It is probable that *distans* may be ultimately proved to be the dry-season form of *Chandica*.

DISTRIBUTION.—There are specimens of both sexes, from Darjiling, in the
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Hewitson Collection at the British Museum, and two females in our own cabinet. Mr. Elwes (Tr. Ent. Soc. 1888, 314) records "a pair taken by Mr. Knyvett at Buxa, in Bhotan."

Of the illustrations of this species on our Plate No. 80, fig. 1 represents the male, and figs. 1, 1a, the type female, described and figured by Mr. Butler in the Lep. Exotica.

DEBIS VINDHYA.

WET-SEASON BROOD (Plate 81, fig. 1, 1a, b, c, ♂, ♀).

Debis Vindhya, Felder, Wien. Ent. Monats, iii. p. 402 (1859), ♂.

Lethe Vindhya, Butler, Catal. Satyr. Brit. Mus. p. 119 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 146 (1888). Elwes, Trans. Ent. Soc. Lond. 1888, pp. 309, 313.

Lethe Alberta, Butler, Ann. and Mag. Nat. Hist. 1871, p. 283, ♂; *id.* Lep. Exotica, p. 87, pl. 33, fig. 5 (1872), ♂. Marshall and de Nicéville, Butt. of India, etc. i. p. 147 (1883).

IMAGO.—Male. Upperside dark violet ochreous-brown; cilia alternated with cinereous. *Forewing* with an indistinctly-defined transverse discal erect straight diffused dusky line. *Hindwing* with a similar wavy curved discal line, beyond which is a series of five large blackish spots, each with a slight rufescent outer ring, the four upper blind, the fifth with a minute white pupil; at the anal angle is a more or less indistinct sixth minute ocellus. Underside dark olivaceous ochreous-brown; crossed by a glossy lilacine-blue outer-bordered straight subbasal dark brown line and a discal line, the latter line on the hindwing being very slightly but bluntly angulated on the median veins; a short lilacine-bordered streak also crossing middle of the cell of the forewing; marginal lines dark brown. *Forewing* with a slightly curved series of six ocelli, the upper one sometimes undeveloped, each with very small black centre and white pupil, an ochreous ring, then a brown ring, and lastly an outer lilacine-blue ring. *Hindwing* with a series of six prominent black ocelli, the upper first and fifth the largest, the lowest duplex, each with a white pupil, an ochreous ring, then a brown ring, and lastly a distinct glossy lilacine-blue outer ring; inner marginal line also lilacine bordered and with a subanal lilacine triangular streak.

Female. Upperside somewhat paler. *Forewing* with the transverse discal line more or less slightly sinuous and also slightly pale-bordered externally; the anterior ocelli of the underside being also slightly visible. *Hindwing* with more prominent ocelli, and each with brighter reddish-ochreous outer ring. Underside somewhat paler than upperside; the transverse lines the same, though the discal line on the hindwing is slightly more angular; ocelli the same. *Body* and legs beneath pale brownish-ochreous; sides of palpi ochreous-white; antennæ reddish-ochreous with pale rings and blackish subterminal band.

Expanse, ♂ $2\frac{5}{8}$ to $2\frac{7}{8}$, ♀ 3 to $3\frac{1}{8}$ inches.

DRY-SEASON BROOD (Plate 81, fig. 1, d, e, ♂, ♀.)

Debis Dolopes, Hewitson, Ent. Monthly Mag. 1872, p. 85, ♀.*Lethe Dolopes*, Marshall and de Nicéville, Butt. of India, etc. i. p. 147 (1883).

IMAGO.—Male. Upperside as in the wet-season brood, except that the black spots on the hindwing are somewhat smaller. Underside with the basal two-thirds dark brown, but slightly paler and of a duller tint than in the wet-season brood; the transverse pale-bordered subbasal and discal line and the cell streak the same; the outer borders of both wings much paler and of a very pale olivescient-ochreous colour, which contrasts strongly with the dark basal portion. *Forewing* with the five ocelli smaller and much less defined. *Hindwing* also with the ocelli smaller and less defined, being about half the size of those in the wet-season brood.

Female. Upperside paler than in male. *Forewing* with the transverse discal sinuous line distinctly pale bordered. *Hindwing* with the black spots distinctly ochreous ringed. Underside as in the male, but paler throughout.

Expanse, ♂ $2\frac{3}{8}$, ♀ $2\frac{5}{8}$ to $3\frac{1}{8}$ inches.

HABITAT.—Sikkim; Bhotan; Assam; Khasia and Naga Hills; Chittagong; Arakan; Upper Tenasserim.

To Dr. Rogenhofer, the Custodian of the Zoological Museum, Vienna, we are indebted for having kindly favoured us with a coloured drawing of the type specimen described by Dr. Felder as *D. Vindhya*, and thus enabling us to identify it as being the same as Mr. Butler's *D. Alberta*.

Regarding the fact that *Vindhya* represents the wet-season form and *Dolopes* the dry-season form of this species, there can be no possible doubt.

Of the illustrations of this species on our Plate No. 81, figs. 1, 1a, b, c, represent the male and female of the wet-season brood, from the Khasia Hills, and fig. 1d, a male of the dry-season brood, also from the Khasia Hills, kindly lent for this purpose by Mr. H. J. Elwes, and fig. 1e, that of the female of the dry-season brood, this latter being the *Dolopes* of Hewitson.

DISTRIBUTION.—According to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 313), "this species is very rare in Sikkim and in Bhotan, and in the Khasia Hills. Mr. Gammie took a single female close to his house, at 3800 feet, in August. Messrs. Knyvett and Möller's native collectors took specimens near Buxa in Bhotan, and I took a single male myself near Cherra Punji in the Khasia Hills, at the end of September, at about 2500 feet." Specimens of the wet-season brood from Shillong and the Naga Hills are in the collection of Mr. P. Crowley. "In the Indian Museum, Calcutta, there are males from Sibsagar, Assam" (Butt. of India, 146). Specimens were taken by Lieut. D. Thompson on the Chittagong side of the Chin Hills, in the cold weather, during the Chin-Lushai Expedition of 1889-90 (Journ. Bomb. N. H.

Soc. 1890, 295), and by Capt. E. Y. Watson on the Burmese side of these hills during the same expedition, "three males and one female being taken at Tiling, 1000 feet, in March" (J. Bomb. N. H. Soc. 1891, 10). Major C. H. E. Adamson (Cat. Butterflies collected in Burma, p. 8) records "three specimens from the Moulmein District and Arakan, in April." Capt. C. T. Bingham (Butt. Ind. 146) "took a single male in the Donat Range, Upper Tenasserim, in January. A specimen from Tenasserim, taken by Capt. Bingham is in the British Museum Collection.

DEBIS SERBONIS (Plate 80, fig. 3, 3a, b, ♂ ♀).

Debis Serbonis, Hewitson, Ent. Monthly Mag. 1876, p. 151; *id.* Desc. Lep. Coll. Atkinson, p. 2, pl. 1, figs. 4, 5 (1879), ♂.

Lethe Serbonis, Marshall and de Nicéville, Butt. of India, etc. i. p. 155 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 310.

IMAGO.—Male. Upperside dark olivescient ochreous-brown, glossy; marginal lines and a submarginal fascia dusky-brown; cilia edged with cinereous. *Forewing* crossed by an extremely indistinct broad dusky discal *glandular fascia*, which is clothed with long and short broad ribbed-scales with dentated tips, and intervening long slender androconia with rounded or truncated base and hair-like tasselled tips, some shorter, stouter hair-tipt scales; and long slender interspersed hairs; beyond which is a pale subapical spot and below the latter a small blackish spot. *Hindwing* with four small submarginal blackish spots, the lowest being most distinct, white pupilled and slightly pale ringed. Underside bright pale olivescient ochreous-brown. *Forewing* crossed by a dark red-brown subbasal line, an inner and an outer short line within the cell, and a wavy—almost sinuous—discal band, the latter pale ochreous bordered externally at its costal end; beyond is a pale ochreous subapical spot cut by the veins, and below it are two small perfect pale brown ocelli, followed by a submarginal dark brown fascia and two marginal lines. *Hindwing* crossed by a prominent red-brown subbasal and a discal wavy line, a series of six prominent ocelli, the upper first, the fifth and sixth being the largest, the sixth duplex, each with a black centre, white pupil, ochreous ring, a black ring, and then an outer ochreous ring, the second, third and fourth the smallest and with minute black centre, white pupil, and similar outer rings; marginal lines dark brown, the inner line bordered posteriorly with red-brown.

Female. Upperside somewhat paler olivescient-brown, glossy; dark marginal lines and submarginal fascia distinct. *Forewing* distinctly palest beyond the transverse discal prominent dusky line, which is slightly undulate, paler bordered externally especially at its costal end; the subapical pale spot and slightly visible lower pale-bordered black spots. *Hindwing* with five submarginal pale-bordered black spots, the lowest with a white pupil. Underside with the ground-colour much

paler and of a brighter ochreous tint than in the male; the transverse markings also brighter red-brown. *Forewing* with the pale outer-bordered discal line inwardly suffused with red-brown; and three ocelli present below the pale subapical spot. *Hindwing* similarly marked. *Body* beneath and legs ochreous; sides of palpi and forelegs beneath paler; antennæ dark ochreous, with black subterminal band.

Expanse, $2\frac{7}{8}$, ♀ $2\frac{3}{8}$ inches.

HABITAT.—Sikkim.

DISTRIBUTION.—“Not uncommon in Sikkim, in the dense virgin forests on Tonglo, Tendong, and Sinchul, from 7000 to 9000 feet, in the rainy season between June and September.” (Elwes, Tr. Ent. Soc. 1888, 317.)

INDO-MALAYAN AND CHINESE ALLIED SPECIES OF DEBIS.—*D. Chinensis* (Leech). Allied to *D. Chandica*. *Habitat.* W. China.—*D. Negrito*, Felder, Wien. Ent. Monat. 1863, p. 124. *Syn.* *D. Isabella*, Butler, P. Z. S. 1866, p. 41, pl. 3, fig. 4, ♂. *Habitat.* Philippines.—*D. Manthara*, Felder, Reise Novara, Lep. iii. p. 497 (1867). Butler, Ann. Nat. Hist. 1867, p. 403, pl. 9, fig. 9, ♂. Closely allied to *D. Mekara*, but somewhat paler beneath, with glossy whitish borders to the transverse lines and also to the ocelli. Examples in the Hewitsonian and British Museum Collection. *Habitat.* Java.—*D. Hecate* (Leech, Entomologist, 1891, p. 3). *Habitat.* W. China.—*D. Cyrene* (Leech, Entomologist, 1890, p. 27). *Habitat.* W. China.—*D. Davidi*, Oberthür, Etudes Entom. vi. p. 15, pl. 7, fig. 5 (1881). *Habitat.* W. China.—*D. Laodamia* (Lethe Laodamia, Leech, Entomologist, 1891, p. 67). *Habitat.*—W. China.

The following is a Chinese allied genus and species. Gen. nov. *Placilla*. Wings broad. *Male*. Upper surface scarcely hairy. *Forewing* triangular, exterior margin slightly scalloped; with an indistinctly defined dusky broad transverse discal glandular fascia. *Hindwing* broadly ovate; exterior margin convex and acutely scalloped; with a conspicuous large rounded glandular patch of blackish lustrous scales situated upon the lower disc and extending across the middle and lower median veinlets. Type *P. Christophi* (Lethe Christophi, Leech, Entomologist, 1891, p. 67). *Habitat.* W. China. A second species of this genus is *P. Camilla* (Lethe Camilla, Leech, *id.* p. 3). *Habitat.* W. China.

Genus LETHE.

Lethe, Hübner, Verz. bek. Schmett. p. 56 (1816). Moore, Lep. of Ceylon, i. p. 16 (1880). Distant, Rhop. Malayana, p. 43 (1882). Scudder, Proc. Amer. Acad. A. and S. Boston, 1875, p. 205.

Lethe (group 2, part), Marshall and de Nicéville, Butt. of India, etc. i. p. 143 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 309.

Debis (part), Doubleday and Westwood, Gen. D. Lep. p. 358 (1851).

IMAGO.—Wings broad; basal area hairy. *Forewing* triangular; costa arched, apex convex, exterior margin waved, slightly concave, posterior margin long,

straight; costal, median, and submedian vein slightly swollen; cell broad across the middle; discocellulars bent close to upper end and at one-third, lower excurved, radials from the angles; median veinlets equidistant and wide apart. *Hindwing* short; costa convex, exterior margin sinuous and bluntly tailed at end of upper median, abdominal margin long; cell rather short and broad; discocellulars oblique, rounded in the middle; two upper medians from end of the cell. *Body* rather stout; eyes densely clothed with short very fine hairs; antennæ with an elongated slender club.

ADULT CATERPILLAR.—Fusiform; head conical, the vertex pointed and projected forward, anal segment acutely pointed and projected hindward.

CHRYSLIS.—Suspended by the tail; broad, and truncated anteriorly, abdominal segments dorsally convex, head and vertex both pointed.

TYPE.—L. Europa.

LETHE EUROPA (Plate 82, figs. 1, 1a, ♂ ♀).

Papilio Europa, Fabricius, Syst. Ent. p. 500, (1775); Ent. Syst. iii. i. p. 76 (1793).

Oreas Marmorea Europa, Hübner, Samml. Exot. Schmett. Band i. pl. 90, fig. 1-4 (1805).

Lethe Europa, Hübner, Verz. bek. Schmett. p. 56 (1816). Butler, Catal. Satyr. Brit. Mus. p. 114 (1868); Catal. Fabr. Lep. B. M. p. 29 (1869). Distant, Rhop. Malay. p. 43, pl. 5, fig. 5, 6, ♂ ♀ (1882). Marshall and de Nicéville, Butt. of India, etc. i. p. 149 (1883). Staudinger, Exot. Schmett. p. 221, pl. 78, ♀ (1887).

Satyrus Europa, Godart, Ency. Méth. ix. p. 478 (1819).

Debis Europa, Westwood, Gen. D. Lep. p. 359 (1851).

Papilio Beroe, Cramer, Pap. Exot. i. pl. 79, fig. C. D. (1779), ♀.

IMAGO.—Male. Upperside olivescient ochreous-brown; marginal line slender, blackish, and narrowly bordered with pale ochreous broadly interrupted with dusky-black; cilia alternated with pale ochreous. *Forewing* with the transverse subbasal line, the oblique discal band, and the ocelli of the underside more or less apparent; two more clearly defined superposed apical whitish spots. *Hindwing* with a series of more or less obsolescent dusky-black submarginal spots, the subapical spot coalescing with the dusky margin. Underside much darker olivescient ochreous-brown; crossed by a prominent violet-white subbasal narrow band on both wings. *Forewing* with a broad short oblique discal band, which is violet-white anteriorly and ochreous posteriorly, and terminates at the middle of the incurved series of six pale violet blind ocelli, each of which has a small irregular-shaped pale-bordered blackish centre, and all encompassed within a violet-white outer bordering line; apex of wing with a small violet patch; marginal line ochreous bordered. *Hindwing* with an acutely sinuous angulated discal line, contiguous to which are six large longitudinally-narrow, confluent, dark ochreous ocelli, the lowest being duplex, each having a

large black centre speckled with ochreous-white scales, the black centres of the five lower ocelli being more or less irregularly broken and incomplete, the upper ocellus is the largest and more oval in shape, all being encompassed by a prominent violet outer sinuous line, the inner portion of this line forming the violet border to the dark sinuous discal line; marginal line with a violet inner-bordering line.

Female. Upperside either somewhat paler or of a more dusky-brown than the male; marginal line whitish-bordered. *Forewing* with a prominent transverse oblique discal broad pure white entire band, the apical white spots similar. *Hindwing* with the pale-bordered dusky-black ocelli of the underside more or less indistinctly visible. Underside of the same colour as in male; markings the same, except that on the forewing the oblique white band extends to near the posterior angle and nearly obliterates the ocellus between the middle and lower median veinlets; the ocelli on the hindwing are also sometimes more elongated. *Body* beneath dark brown; legs beneath and sides of palpi pale brownish-ochreous.

Expanse, $2\frac{6}{8}$ to $3\frac{1}{8}$ inches.

HABITAT.—Plains of India; W. and E. Himalayas; Assam; Khasias; Burma; Andamans; Malaya; China.

DISTRIBUTION WITHIN INDIAN AREA.—In his list of Kumaon butterflies (J. A. S. Beng. 1886, 115), Mr. Doherty records it from “Ranibagh at the foot of the hills, 1000 feet.” Mr. de Nicéville took it in October in Sikkim Terai (J. A. S. Beng. 1880, 49). According to Mr. Elwes (Tr. Ent. Soc. 1888, 314), “this is not a common butterfly in Sikkim. It is probably rather an inhabitant of the plains, and only a straggler in the low valleys of Sikkim.” Mr. J. A. Betham (Journ. Bombay Nat. Hist. Soc. 1890, 157) obtained it in the Central Provinces, and says, “this is a shade-loving insect, but is easily procured in the evening at sugar. They are also fond of Mhowa (*Bassia latifolia*) refuse after the spirit has been extracted from the flowers. It is shy and easily scared.” It was taken by the late Dr. F. Day at Coonoor, and Mr. Hampson (J. A. S. Beng. 1888, 348) obtained it on the Nilgiris from 3000 to 5000 feet; rather rare. Mr. W. C. Taylor (List of Orissa Butterflies, p. 2) records it as not uncommon at Khorda. The late Mr. W. S. Atkinson obtained it in the neighbourhood of Calcutta, and “Major Marshall found it commonly in the Barrackpore Park in November.” (Butt. India, i. 150). Mr. J. Rothery (Ent. Mo. Mag. 1882, 34) also records it from Barrackpore Park near Calcutta, and Mr. de Nicéville (J. A. S. Beng. 1885, 42) says that “in the Calcutta District this species is found in the cold weather affecting dry ditches, occurring also during the rainy season.” Mr. Wood-Mason (J. A. S. Beng. 1886, 350) records “several specimens taken in the forests around Silchar in Cachar.” Major Godwin-Austen obtained it in the Khasias, and the late Mr. W. S. Atkinson took it in Silhet and Cherra Punji.

Mr. de Nicéville also records it from Assam. Major C. H. E. Adamson (Catal. of Burmese Butterflies, p. 8) states that it is "common in Burma." Capt. E. Y. Watson (Journ. Bombay N. H. Soc. 1891, 10) obtained it during the Chin-Lushai Expedition of 1889-90, "from Pauk to Tilin, in November, and at Tilin from November to May." Signor Leonardo Fea obtained it at Bhamo in November. In Upper Tenasserim, "Capt. C. T. Bingham took it from December to April" (Butt. India, i. 150). Messrs. Elwes and de Nicéville (J. A. S. Beng. 1887, 417) records it from Tavoy, and Dr. J. Anderson (Journ. Linn. Soc. Zool. 1886, 32) obtained it in "Mergui during March." In the Andamans, the late Mr. F. A. de Roepstorff (P. Z. S. 1877, 582) took numerous specimens at Port Blair.

DISTRIBUTION OUTSIDE INDIAN AREA.—It was obtained in Siam by the late Mr. Mouhot. Mr. Distant (Rhop. Malayana, p. 43) records it from Malacca and Penang Island, "appearing in paddy-fields at dusk." Mr. W. Doherty (J. A. S. Beng. 1891, 24) obtained it on Engano Island (Nias group), remarking that it was "scarce." It is also recorded from Sumatra. The late Dr. Horsfield (Catal. Lep. Mus. E. I. C. i. p. 216) took it in Java, these specimens being identical with Indian examples. Mr. H. Druce (P. Z. S. 1873, 339) records it from Borneo. I have it from Sarawak. Herr G. Semper (Reisen Archipel. Philippen Lep. i. p. 44) records it from Luzon and Mindanao. Specimens from Hong Kong are in Mr. J. H. Leech's Collection, and also in the British Museum. The late Consul R. Swinhoe (P. Z. S. 1878, 698) obtained it on the Island of Hainan and also on Formosa (P. Z. S. 1866, 360) remarking that it "loves to cluster on bamboo stems." There is a specimen of the female in the British Museum from Kiukiang on the Yangzee, W. China. Specimens have been verified from all the above-mentioned localities. It does not occur in Celebes, as has been recorded by Herr Snellen, the species from the latter island being *L. Arcuata*, Butler, and totally distinct both from *L. Europa* and from *L. Arete*, Cram., from Sula—as verified by personal comparison of specimens of both sexes of these species in our own collection.

LETHE TAMUNA (Plate 82, fig. 2, ♀).

Lethe Tamuna, de Nicéville, Proc. Zool. Soc. Lond. 1887, p. 449, pl. 39, fig. 6, ♀.

IMAGO.—Male *unknown*. "Female. Upperside dull, dark fulvous. *Forewing* with the apical half fuscous, bearing two pure white spots below the costa, placed midway between the apex and the median ochreous band, the upper of the two spots much the smaller, and divided into two portions by the fourth subcostal nervule; below these spots in the upper discoidal interspace is an obscure oval black spot; near the margin are four bright ochreous lunules placed between the veins from

the lower discoidal nervule to the inner angle, beyond these lunules in each interspace is a fine ochreous line; across the disk of the wing, from the middle of the costa to near the inner angle, is a broad bright ochreous band, its inner edge nearly straight and even, its outer edge produced into points between the veins, the lower portion of the band composed of two spots (the lower one very small) in the submedian interspace. *Hindwing* with the ocelli of the underside more or less showing through by transparency; a series of bright ochreous lunules with inner dark borders placed near the outer margin between the veins, with a darker ochreous line beyond. Underside dull brown. *Forewing* with a whitish subbasal line crossing the middle of the discoidal cell from the subcostal to the submedian nervure; the broad discal band as above, but with its edges more even and wider at its lower end; beyond it are four ill-shaped ocelli with black pupils dotted with white, a pale violet ring, then a browner ring and an outer pale violet ring; the margin marked much as above. *Hindwing* with a subbasal line in continuation of that on the forewing, not reaching the abdominal margin; a discal series of ocelli placed on a pale violet band, which more or less follows their outline; the upper ocellus very large, its centre deep black dotted with white, then a broad rich ochreous ring, outwardly defined with a fuscous ring; the next largest ocellus is in the first median interspace, with two very small, equal-sized ocelli in the interspaces above and below it, and two very small and indistinct ocelli divided by the discoidal nervule; the bright ochreous lunules on the margin of the upperside white, almost silvery on the underside."

"Expanse, ♀ 2 $\frac{3}{4}$ inches."

HABITAT.—Little Nicobar.

"This is a local form of the widely-distributed *L. Europa*, which occurs in the Andamans (but is replaced apparently in the Nicobars by this species). The female may be at once distinguished from the same sex of *L. Europa* by its more tawny coloration on the upperside, the *discal band bright ochreous* instead of white, with its outer edge more irregular, and by the underside of the hindwing having four well-formed perfect ocelli; in *L. Europa* the black middle portion of all the ocelli except the upper one is entirely disintegrated and broken up into black dots. Mr. E. H. Man obtained a single specimen on Little Nicobar."

The illustration of this species on our Plate 82, fig. 2, represents the female, reproduced from Mr. L. de Nicéville's figure of the type specimen.

LETHE DRYPETES (Plate 83, figs. 1, 1a, b, c, d, ♂ ♀, and larva and pupa).

Debis Drypetes, Hewitson, *Exotic Butterflies*, iii. p. 76, *Debis* pl. 2, figs. 11, 12 (1863), ♀.

Lethe Drypetes, Moore, *Lep. of Ceylon*, i. p. 17, pl. 8, figs. 1, a, b, ♂ ♀ (1880); *id.* pl. 210, figs. 5, 5a, larva and pupa.

Debis embolima, Butler, Ent. Monthly Mag. iii. p. 77 (1866), ♂; *id.* Catal. Satyr. Brit. Mus. p. 115 (1868).

Lethe Todara, Moore, Trans. Ent. Soc. Lond. 1881, p. 305. Marshall and de Nicéville, Butt. of India, etc. i. p. 151 (1883). Hampson, J. A. S. Beng. 1888, p. 348.

IMAGO.—Male. Upperside dark olivaceous ochreous-brown, glossy; marginal lines darker brown; cilia brownish-ochreous. *Forewing* without markings, except a faint trace of a pale apical spot, and of the blackish ocelli of the underside. *Hindwing* with three or four submarginal very indistinct small black spots. Underside dark brown, suffused with a more or less vinaceous tint; both wings with a transverse subbasal wavy purplish-grey bordered dark duplex line. *Forewing* with a dark brown oblique transverse discal purplish-bordered band, which is angulated at end of the cell and below the lower median veinlet; followed by a submarginal curved row of five small purple-bordered ocelli, the upper one being ill-defined, and a marginal narrow dark brown pale-bordered line. *Hindwing* with a transverse discal medially-angulated purple-bordered dark brown line; a submarginal row of six purple-grey bordered ocelli, the upper one and the fifth only being regularly formed, with a black centre, white pupil and ochreous outer ring, the others are longitudinally oval and numerous white-speckled, the sixth being duplex; marginal line distinct and purple-grey bordered.

Female. Upperside paler olivaceous ochreous-brown, externally dusky-brown. *Forewing* with an oblique transverse discal ochreous-white irregular band broken by the upper and middle median veinlets, and extending only to the lower median veinlet; two small subapical ochreous-white spots, and three submarginal small indistinct black spots. *Hindwing* with four upper submarginal ochreous-yellow bordered black spots, the upper second spot being large, quadrate, and extending to the pale-bordered marginal line, the third and fourth smaller and black, the upper first and the two lowest being the ocelli of the underside more or less indistinctly indicated. Underside paler, markings as in the male, except that on the forewing the oblique discal band is purplish-white, the lower submarginal ocellus sometimes absent, or present only as a minute brown dot; and the ocelli on both wings are more prominent and bordered with purplish-white. *Body* beneath, legs and palpi at the sides brownish ochreous.

Expanse, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

ADULT CATERPILLAR.—Fusiform; head conical, the vertex pointed and projected forward, anal segment acutely pointed and projected hindward. Colour pale green with paler transverse lines on each segment, a lateral and a sublateral pale-bordered reddish stripe extending the whole length, including the head and anal segment. Feeds on bamboo.

CHRYsalis.—Suspended by the tail; broad, and truncated anteriorly, abdominal segments dorsally convex, head and vertex both pointed; colour pale green.

HABITAT.—S. India; Ceylon.

There is no distinctive difference between South Indian specimens and those of Ceylon.

DISTRIBUTION.—In his "List of Orissa Butterflies," p. 2, Mr. W. C. Taylor records it as "not uncommon at Khurda." Specimens have been "taken at Mynall, at 2000 feet in May," also at 3000 feet in March and April, and "at Trevandrum in June," as well as at Calicut in September (Butt. India, 151). Mr. G. F. Hampson (J. A. S. Beng. 1888, 348) obtained it on the "Nilgiris at 3000 to 5000 feet, being common in the low country jungles and on the slopes of the Hills." A female obtained by Mr. Davidson on the Anaymalai Hills, 3000 to 4000 feet, South of the Palghat Gap, is in the Collection of Mr. F. D. Godman. In Ceylon, Capt. Hutchison (Lep. Ceylon, i. 18), took it "in the Hills of the Central Province, at 3000 feet and slightly above, at all times; being very local, and found in several spots of limited extent." Mr. F. M. Mackwood notes that it is "sometimes found at lower elevations, but as a rule over 3000 feet." Mr. E. E. Green captured it at Pundaloya in March and April.

Of the illustrations of this species on our Plate No. 83, figs. 1, 1a, b, c, represent the male and female, and fig. 1d the larva and pupa from drawings made by Mr. E. Ernest Green in Ceylon; the larva having been taken feeding on Bamboo.

LETHE DYRTA (Plate 82, figs. 3, 3a, b, c, ♂ ♀).

Debis Dyrtta, Felder, Reise Novara, Lep. iii. p. 497 (1867), ♀.

Lethe Dyrtta, Butler, Catal. Satyr. Brit. Mus. p. 115 (1868); *id.* P. Z. S. 1886, p. 357. Marshall and de Nicéville, Butt. of India, etc. i. p. 152, pl. 10, fig. 22, ♂ ♀ (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 309. Staudinger, Exot. Schmett. p. 221, pl. 78, ♂.

IMAGO.—Male. Upperside olivaceous-brown, darkest apically on the forewing; marginal lines pale ochreous-bordered; cilia alternated with white. *Forewing* with two subapical whitish spots, and a costal whitish spot traversed by the subcostal veinlets, this latter spot forming the upper end of the oblique transverse pale band of the underside which is slightly apparent from the upperside, as are also the four ocelli of the underside. *Hindwing* with the ocelli of the underside slightly visible. Underside olivaceous-brown; crossed by two dark brown subbasal and a discal somewhat sinuous lilacine-white narrow band, the inner subbasal being ill-defined, and both the inner and outer line on the forewing only crossing the cell; marginal line externally bordered with ochreous and internally with lilacine-white. *Forewing* with

an oblique angulated discal lilacine-white band externally bordering the discal line and crossed by the brown veins, contiguous to which is a curved series of prominent ocelli encompassed by a lilacine outer border; one or two upper ocelli being also incipiently indicated. *Hindwing* with six ocelli, the upper one very large and oval, the fifth smaller and reversely oval, both with a large black centre and narrow ochreous outer ring, the upper one with a prominent white pupil and several white speckles; the fifth blind; the second, third, fourth, and sixth narrow, with partly ochreous and black broken centre and white speckles, the sixth being duplex, all encompassed in a prominent lilacine-white outer sinuous line.

Female. Upperside olivaceous-brown. *Forewing* darkest externally; crossed by a prominent oblique white wavy band ending in a more or less apparent small spot above the submedian vein; two costal white spots, and the three blackish ocelli of the underside slightly visible. *Hindwing* with the ocelli of the underside slightly visible. Underside of the same colour but somewhat paler than in male; the transverse lilacine-white lines narrower and also paler, the marginal-bordered lines the same, and also the ocelli on the hindwing, but on the forewing is the broad white oblique band, which extends uninterruptedly in a curve to the submedian vein; there are also only three prominent ocelli on the forewing, besides the two upper incipient spots, the one between the middle and lower median veinlets being entirely absent. *Body* beneath, legs and sides of palpi pale ochreous.

Expanse, ♂ 2 to 2 $\frac{4}{8}$, ♀ 2 to 2 $\frac{5}{8}$ inches.

HABITAT.—N.W. and E. Himalayas; Khasia Hills; Burma.

DISTRIBUTION AND HABITS.—In the N.W. Himalayas it was obtained by the late Dr. Bayne Reed "in Kashmir from May to September, being very common about houses" (Notes 1872). The late Capt. H. B. Hellard, in his "Notes," records it as being taken at "Simla, Masuri, and Kashmir—from June to October." Capt. (now Colonel) A. M. Lang obtained it at Kassowlie, 6000 feet, frequenting grassy slopes in the shade or near hedges; "constantly pitching under bushes or at roots of trees, and lying *perdu*." (P. Z. S. 1865, 498, where these remarks are assigned to D. Europa—*Dyrta* not having been discriminated at that date.) We have a male of *Dyrta*, taken by Colonel Lang at "the Krolee, Kussowlie, in April." Major J. W. Yerbury (P. Z. S., 1886, 357) records the capture of specimens of the "male at Bugnoter in September, about 4000 to 5000 feet, and between Bugnoter and Abbottabad also in September; at Kali Pani, about 5000 feet, in September, and at Tret in October. Females also taken between Tret and Murree also on the same day in October. Specimens again were taken at Dewal in August, and afterwards found commonly below Bugnoter in September, and between Abbottabad and Kali Pani." Major Yerbury also notes (Ann. Nat. Hist. 1888, 135) its capture near Kootoor, Chittah, Pahar, about 2000 feet, in October. Very common below Bugnoter on

the Murree and Abbottabad Road, also near Kala Pani in September. A single specimen taken in Chittar Pahar at April, also taken at Dewal, Murree, and on the Kashmir Road. Rev. J. H. Hocking (P. Z. S. 1882, 235) obtained it in the Kangra District. Mr. W. Doherty (J. A. S. Beng. 1886, 115) records it from the "Lower Himalayan tract, in Kumaon, at 3000 to 6000 feet." In the Eastern Himalayas, according to Mr. Elwes (Tr. Ent. Soc. 1888, 314), this is "not a common species, but found throughout the year at elevations up to 3000 or 4000 feet." Mr. de Nicéville (J. A. S. Beng. 1883, 93) obtained it in "Sikkim, in October." It is recorded (Butt. Ind. 152) from the "Khasia Hills, in May and November." In Burma, according to Major C. H. E. Adamson (Catal. of Burmese Butterflies, p. 8), "this butterfly is very common at Bhamo throughout the rains." Capt. E. Y. Watson (Journ. Bombay N. H. Soc. 1891, 10) obtained it during the Chin-Lushai Expedition from "Pauk to Tilin, in October, and at Tilin from March to May." In the Shan States, Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 518) records it as "very common all the year round." Capt. C. T. Bingham (Butt. Ind. 152) found it in Tenasserim.

DISTRIBUTION OUTSIDE INDIAN AREA.—Both sexes were obtained in Java by the late Dr. Horsfield. A specimen labelled "China" is in the British Museum Collection, and a male from Amoy in the Hewitsonian Collection. Specimens from Kiu-kiang, W. China, are in Mr. J. H. Leech's Collection, and also in that of Mr. H. Grose-Smith.

LETHE NEELGHERIENSIS (Plate 84, figs. 1, 1a, b, c, d, ♂ ♀ and larva).

Satyrus (Cyllo) Neelgherensis, Guerin, in Delessert's Voyage dans l'Inde, pt. 2, p. 74, pl. 21, figs. 1, 1a, (1843), ♂.

Debis Neelgherensis, Moore, Catal. Lep. Mus. E. I. Company, i. p. 217 (1857). Hewitson, Exotic Butt. iii. p. 75, *Debis* pl. 2, fig. 6, ♀ (1863).

Lethe Neelgherensis, Butler, Catal. Satyr. Brit. Mus. p. 115 (1868). Moore, Lep. of Ceylon, i. p. 16, pl. 7, figs. 1, 1a, ♂ ♀ (1880); *id.* pl. 210, fig. 4, larva.

IMAGO.—Upperside dull dark olive-brown, more dusky-brown apically; cilia alternated with white. Male.—*Forewing* with two small ochreous-white apical spots, a larger costal spot, and a less distinct spot between the middle and lower median veins; between these the ocelli of the underside are indistinctly visible; beyond is a marginal indistinct dusky double lunular line. *Hindwing* with the pale-bordered blackish ocelli of the underside indistinctly visible; marginal lines dusky-brown, pale ochreous bordered. Underside paler, and of a violet-brown tint; crossed by two subbasal and a discal sinuous lilacine-grey bordered band, the inner subbasal indistinct, and the inner and outer line on the forewing only crossing the cell and widely separated, the discal line on the hindwing angulated at the upper median

veinlet. *Forewing* with an oblique ochreous-white band broadly externally bordering the discal line; beyond is a submarginal row of four prominent purple-bordered ocelli and two small upper apical incipiently formed spots; marginal line purple-grey bordered. *Hindwing* with a submarginal series of six prominent ocelli, the upper one very large, oval, the fifth smaller, round, the others more elongated, the lowest being duplex, each ocellus deep black, the first and fifth perfect and with a white pupil, the others black speckled, an ochreous and then a brown outer ring, and all again encircled by a purple-white ringleted line; marginal line purple-bordered internally and ochreous externally.

Female. Upperside. *Forewing* with two prominent ochreous-white apical spots, and three oblique transverse discal spots, the small blackish ocelli of the underside being slightly visible. *Hindwing* with the pale-ringed blackish ocelli of the underside more distinctly visible, the upper two or three being externally bordered with ochreous-white; marginal lines ochreous bordered. Underside as in the male, but brighter coloured; markings the same, except that on the forewing the oblique discal ochreous-white band is broader and irregularly continuous, and extending to the posterior angle; the lower ocellus is absent, though indicated by a small black central spot. *Body* beneath brownish-ochreous; palpi at the sides, fore-legs and femora beneath, whitish.

Expanse, $2\frac{4}{5}$ to $2\frac{5}{8}$ inches.

ADULT CATERPILLAR.—Fusiform, elongated; head conical, the vertex being prolonged to an acute point projecting forward; anal segment also prolonged to a point projecting hindward. Colour green, with darker dorsal and lateral stripes, and a slight ochreous subdorsal stripe. "Feeds on grasses" (E. E. Green).

CHRYSLIS.—Unknown.

HABITAT.—Central and Southern India; Ceylon.

This species is distinguishable from *L. Dyrta*, in the male, by the upperside having a more prominent costal and apical spots, and in the presence of a lower marginal spot between the middle and lower median veinlets, and on the underside, though extremely alike, the middle, pale band crossing the cell on the forewing is always broader. In the female the oblique discal ochreous-white band on the forewing is macular, and is composed of three widely-separated spots.

DISTRIBUTION.—Mr. J. A. Betham (Journ. Bombay N. H. Soc. 1890, 158) records it from the Central Provinces, noting that "its habits are the same as *L. Europa*." According to Mr. de Nicéville (Butt. India, 154), "Colonel Swinhoe has taken it at Mhow in the autumn, and also commonly at Abu." Colonel Swinhoe (P. Z. S. 1885, 127) also records it from "Belgaum, and from Poona, in November," and (P. Z. S. 1886, 424) from "Mhow in April and May." He also obtained it at

Mahableshwar in May. Major J. W. Yerbury notes that he took it on Matheran Hill in October. Mr. E. H. Aitken (Butt. India, 154) "took it at Khandalla in April." The type specimen was taken on the Nilgiris. Mr. G. F. Hampson (J. A. S. Beng. 1888, 349) also obtained it on the Nilgiris, being common from 2000 to 7000 feet. The late Dr. J. Shortt sent me specimens from the Shevaroy Hills; and the late Dr. F. Day specimens from Coonoor. Mr. H. Ferguson (Butt. India, 154) "took it on the Ashamboos Hills in Travancore, in May, and again in Trevandrum in July." In Ceylon, Mr. Hutchison (Lep. Ceylon, i. 16) "found it in the neighbourhood of coffee plantations South of Newera Eliya, at about 3000 feet elevation; appearing plentiful, except from January to March." Capt. Wade also took it at Kandy and Dickoya. Mr. F. M. Mackwood (MS. Notes) remarks that it is "the most commonest of the group in Ceylon, being found everywhere above 3000 feet, and sometimes much lower, in shady places or in jungle, and all the year round." Mr. E. E. Green obtained it at Pundaloya.

Of the illustrations of this species on our Plate No. 84, figs. 1, 1a, b, c, represent the male and female, and fig. 1d the larva, reproduced from a drawing made in Ceylon by Mr. E. Ernest Green, who found it feeding on grass.

LETHE DARETIS (Plate 83, figs. 2, 2a, b, c, ♂ ♀).

Debis Daretis, Hewitson, Exotic Butterflies, iii. p. 75, *Debis* pl. 2, figs. 7, 8 (1863), ♀.

Lethe Daretis, Butler, Catal. Satyr. Brit. Mus. p. 118 (1868). Moore, Lep. of Ceylon, i. p. 18, pl. 7, figs. 2a, b (1880), ♂ ♀. Marshall and de Nicéville, Butt. of India, i. p. 151 (1883).

IMAGO.—Male. Upperside dark olivaceous-brown, glossy; cilia alternated with ochreous-white. *Forewing* with a slightly apparent transverse discal dusky angular line, at the costal end of which is a very small ochreous-yellow spot above end of the cell, and beyond are two small less distinct spots before the apex. *Hindwing* with a submarginal row of five small indistinct black slightly pale-bordered spots. Underside dark brown; both wings with a subbasal and a medial transverse sinuous darker brown duplex-bordered purplish-grey band, the latter on the hindwing angulated between the radial and upper median veinlet. *Forewing* with a slightly oblique irregular discal transverse pale ochreous band externally bordering the angulated discal line; beyond which are five pale purplish-brown submarginal ocelli, the upper one ill-defined, each with small black centre and purplish-grey outer ring; marginal lunular line pale purplish-brown. *Hindwing* with six distinct well-formed purple-grey ringed submarginal ocelli, each with black centre, small white pupil, and a few minute white speckles; marginal line lunular, purple-grey.

Female. Upperside ferruginous olivaceous-brown, dusky brown externally. *Forewing* with a prominent ochreous-yellow transverse discal macular band extending

to the submedian vein; two prominent ochreous-yellow subapical spots, and four or five, small, very indistinct blackish submarginal spots. *Hindwing* with a submarginal series of five well-defined ochreous-yellow bordered black oval spots, and a sixth or anal very slightly visible smaller spot; marginal line anteriorly bordered with ochreous-yellow. Underside of the same colour as in the male, markings the same, but more prominent, and except that on the forewing the oblique discal ochreous-yellow band is much broader, and paler. *Body* dark, paler beneath; palpi at the sides and fore-legs beneath greyish white; middle and hind-legs ochreous-brown, hind femora in female greyish-white beneath.

Expanse, ♂ $2\frac{1}{10}$, ♀ $2\frac{4}{10}$ inches.

HABITAT.—Ceylon.

DISTRIBUTION AND HABITS.—According to Capt. Hutchison (Lep. Ceylon, i. 18), "found all the year round, but most plentiful in the spring on the hills of the Central Province, at about 5000 to 6000 feet elevation, in grass land or close to forests. Rather shy; flight rapid, often settling down in grass or on open road." Mr. F. M. Mackwood notes that it is "plentiful in roadways through jungle about 4000 feet and over." Mr. E. Ernest Green obtained it at Pundaloya in August.

LETHE ROHRIA (Plate 84, figs. 2, 2a, b, c, ♂ ♀).

Papilio Rohria, Fabricius, Mant. Ins. ii. p. 45 (1787); Ent. Syst. iii. p. 75 (1793).

Satyrus Rohria, Godart, Encyc. Méth. ix. p. 479 (1819).

Debis Rohria, Westwood, in Doubleday and Hewits, Gen. D. Lep. p. 360 (1851). Moore, Catal. Lep.

Mus. E. I. Compy. i. p. 217 (1857).

Lethe Rohria, Butler, Catal. Satyr. Brit. Mus. p. 116 (1868); Catal. Fabrician Lep. Brit. Mus. p. 29 (1869). Marshall and de Nicéville, Butt. of India, etc. i. p. 156 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 309.

IMAGO.—Male. Upperside dusky-brown, in fresh specimens virescent tinted, but with age fading to an olivaceous tint; marginal lines blackish; cilia alternated with white. *Forewing* crossed by a prominent virescent-white oblique discal band, and two less prominent oblique subapical small spots, the upper one being cut by the subcostal veinlets. *Hindwing* with very faint traces of the pale-bordered black ocelli of the underside visible; marginal lines ochreous-bordered. Underside more or less dark brown, with either a virescent or olivaceous-castaneous tint; marginal blackish lines distinct, the outer line bordered with ochreous and the inner line with more or less vivid bluish-grey. *Forewing* with a prominent transverse subbasal more or less vivid bluish-grey nearly straight line; the oblique discal virescent white band as on the upperside; a narrow bluish-grey costal spot, below which are three decreasing ochreous-ringed ocelli, the lowest ill-defined, or sometimes absent, all encompassed by a bluish-grey narrow line continued on each side from the costal

spot. *Hindwing* with a similar prominent bluish-grey subbasal line and an angulated discal line, beyond which is a series of six prominent black ocelli, the upper one and the fifth being the largest, the sixth duplex, each with a distinct white pupil, ochreous ring, then a dark brown ring, and all encircled by a more or less vivid bluish-grey outer ring; in some specimens these ocelli possess some white speckles in addition to the white pupil.

Female. Upperside of the same colour as in the male. *Forewing* with the oblique white band slightly broader, and the oblique subapical white spot more prominent. *Hindwing* with the ocelli of the underside more distinctly visible. Underside of the same colour, but paler, and less brilliant than in the male, the markings the same. *Body* and legs beneath pale brownish-ochreous; sides of palpi greyish-white; antennæ black above, with ochreous tip.

Expanse, ♂ 2 to $2\frac{1}{3}$, ♀ $2\frac{1}{3}$ inches.

HABITAT.—N.-W. and E. Himalayas; Khasia Hills; Cachar; Burma; Java.

DISTRIBUTION.—Capt. Bayne Reed obtained it in Kashmir. "It is found in Kumaon at moderate elevations, and Colonel Lang possesses a specimen from Gurhwal. Mr. de Nicéville has taken specimens in the neighbourhood of Simla" (Butt. of India, i. 156). The Rev. J. Hocking (P. Z. S. 1882, 235) records it from the Kangra District. Mr. W. Doherty, in his list of Kumaon butterflies (J. A. S. Beng. 1886, 117), records it as "common in the Lower Himalayan tract, at 2000 to 7000 feet elevation." The late General G. Ramsay obtained it in Nepal, and "Dr. Scully also took a pair at Khatmandu, in Nepal." The late Mr. W. S. Atkinson obtained it at Darjiling. "Mr. Otto Möller has taken it in the Sikkim Tarai in July, in the Sikkim Hills, where it appears to be common, at 4000 feet elevation in April, August, September to November, and also in the Great Ranjit Valley in November, at 1200 to 3500 feet elevation, where Mr. de Nicéville also took it commonly in October" (Butt. of India, i. 156). Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 315) records it as "common in the low valleys of Sikkim up to 5000 feet, from April till November." Mr. G. C. Dudgeon obtained it in Sikkim in March. "In the Khasia Hills it is found in the autumn" (Butt. India, i. 156). Mr. J. Wood-Mason (J. A. S. Beng. 1887, 350) records specimens from "the forests in Silchar, and others taken on Nemotho, in Cachar, in September, the males of this species emitting a delicious vanilla-like scent." Major C. H. E. Adamson (Catal. of Burmese Butterflies, p. 8) states that it is "common in the dry season." Capt. E. Y. Watson (J. Bombay N. H. Soc. 1891, 10) obtained it during the late Chin-Lushai Expedition "from Pauk to Tilin in November, and at Tilin in March." Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 518) says it is "a common species in the Shan States, having taken it during the rains and the commencement of the cold weather." In Upper Tenasserim, Mr. Otto Limborg (P. Z. S. 1878, 824) obtained it at Hatseiga, Nathoung to Paboga, and at Taoo, 3000 to

5000 feet elevation." "Captain C. T. Bingham took it in the Mepley Valley in February, and in the Upper Thoungyeen forests in April, September, and October" (Butt. India, i. 156). Signor Leonardo Fea obtained it in the Karen Hills in September and November, and also at Bhamo in November. Messrs. Elwes and de Nicéville (J. A. S. Beng. 1887, 417) record it from Ponsekai in Tavoy.

DISTRIBUTION OUTSIDE INDIAN AREA.—The late Dr. Horsfield obtained specimens (identical with Indian and Burmese examples) in Java (Catal. Lep. Mus. E. I. C. i. 217).

LETHE HYRANIA (Plate 85, figs. 1, 1a, b, c, ♂ ♀).

Satyrys Hyrania, Kollar, in Hügel's Reise Kaschmir, iv. pt. 2, p. 449, pl. 17, figs. 1, 2 (1844), ♂.

Lethe Hyrania, Butler, Catal. Satyr. Brit. Mus. p. 116 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 154 (1883).

Elwes, Trans. Ent. Soc. Lond. 1888, p. 309.

Satyrys Isana, Kollar, in Hügel's Reise Kaschmir, iv. pt. 2, p. 448, pl. 16, figs. 3, 4 (1844), ♀.

Lethe Dinarbas, De Nicéville, Journ. As. Soc. Beng. 1886, p. 250, pl. xi. fig. 4, ♀ (*nec Hewitson*).

IMAGO.—Male. Upperside dark olivescient ochreous-brown, somewhat glossy; marginal lines dusky-brown. Cilia brownish-cinereous. *Forewing* crossed by a very indistinct straight oblique discal paler posteriorly-decreasing band, which has its inner edge more sharply defined; beyond is an oblique slender pale ochreous subapical spot traversed by the subcostal veinlets, and below which is sometimes visible, one, two, or even three small round blackish submarginal spots. *Hindwing* with five submarginal black spots, the upper first more or less indistinct; the second usually the largest and oblong, the third smallest, the fifth white pupilled, and all indistinctly pale ringed. Underside paler; marginal lines distinct and pale bordered. *Forewing* with two short transverse dark brown lines within the cell; an oblique transverse discal somewhat sinuous dark brown line, with broad pale brownish-white outer border posteriorly decreasing to the middle of the wing; a pale trifid subapical spot, below which are three equal-sized cinereous-brown ocelli, each with a minute white pupil and all encompassed by a similar coloured border. *Hindwing* crossed by a dark brown subbasal nearly straight line and an irregular undulated discal line; discocellular veinlet also dark brown; beyond are six prominent black ocelli, the upper first and the fifth the largest, the sixth duplex, each with a white pupil, an ochreous ring, then a dark brown ring, and an outer pale greyish-brown ring.

Female. Upperside somewhat paler olivescient-brown, the apex of forewing dusky brown. *Forewing* crossed by a broad conspicuous white oblique discal band, which is traversed by the brown veins, and terminates in a small spot at the posterior angle; a subapical small white oblique spot cut by the subcostal veinlets. *Hindwing* as in the male, except that the submarginal spots are more prominent, larger

and more distinctly ochreous bordered. Underside with the oblique white band and small subapical spot, as on upperside, the white band sometimes slightly bulged out on the middle of its inner edge, the band also broadly edged interiorly with bright dark brown; the three submarginal ocelli as in the male. *Hindwing* with the subbasal and discal transverse line, as in male, bright dark brown; ocelli and marginal lines also as in male. *Body* beneath, legs, and sides of palpi pale brownish-ochreous; antennæ with prominent black terminal band.

Expanse, ♂ $2\frac{2}{3}$ to $2\frac{4}{5}$, ♀ $2\frac{2}{3}$ to $2\frac{3}{5}$ inches.

HABITAT.—N. W. Himalayas.

DISTRIBUTION AND HABITS.—Baron von Hügel obtained the male and female at "Simla and Masuri." Col. A. M. Lang (Ent. Mo. Mag. 1864, 181) says this insect "frequents a region about 200 miles from Kasauli, in damp glens, where tall rocks cast a shadow all day, this insect is to be found pitched on the rocks or at their foot, or in the rank vegetation near, but never seeks the broad sunshine." "Both sexes were taken by Col. Lang at an elevation of 7000 feet, at Masuri, in June, and in Lower Kunawur" (Butt. of India, i. 155). Capt. H. B. Hellard (MS. Notes) records it from Simla and Masuri, at end of June and beginning of October." "Major C. T. Marshall obtained numerous males in May in Chumba, and both sexes were taken by Capt. A. G. Young in Kulu from May to July, also the male only by Mrs. Deane in Chini in June" (Butt. of India, 155). The Rev. J. Hocking (P. Z. S. 1882, 235) records specimens from the Kangra District, N. W. Himalayas. Mr. W. Doherty (J. A. S. Bengal, 1886, 115) obtained it in "Kumaon generally at 3000 to 7000 feet."

LETHE DINARBAS (Plate 85, figs. 2, 2a, b, ♂ ♀).

Debis Dinarbass, Hewitson, Exotic Butterflies, iii. p. 77, *Debis* pl. 3, fig. 15 (1863), ♂. Butler, Catal. Satyr. Brit. Mus. p. 117 (1868). Marshall and de Nicéville, Butt. of India, i. p. 155, (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 309.

IMAGO.—Male. Upperside darker brown than in *L. Hyrانيا*, and of a more vinaceous tint. *Forewing* crossed by a similar but narrower pale-bordered oblique discal dusky-brown line, which is somewhat excurved; subapical pale spot and lower black spots similar. *Hindwing* with more prominent submarginal black spots. Underside darker than *L. Hyrانيا*. *Forewing* with similar markings; the oblique discal line somewhat excurved, its upper outer border, the interspace between the cell streaks, and borders of the ocelli being vivid purplish-grey. *Hindwing* with a similar but darker subbasal and discal line, and more prominent ocelli, the interspace between the subbasal and discal line washed with purplish-grey, and the outer borders of the ocelli vivid pale purplish-grey.

Female. Upperside brighter coloured than *L. Hyrania*, and of a more ochreous-brown tint. *Forewing* with the oblique transverse discal band narrower, ochreous-white in tint, almost broken by the middle median veinlet and terminating in a small spot just below the submedian vein; subapical oblique spot more distinct and with an accompanying lower pale spot. *Hindwing* with the submarginal spots larger, blacker, and with brighter ochreous outer rings; the marginal lines more ochreous. Underside similar to *L. Hyrania*; the interspace between the cell streaks, the sub-basal and discal line, and the bordering of the ocelli on both wings more vividly pale purplish-grey. *Forewing* with the ocelli well formed and with ochreous irides; the oblique discal band much narrower and ochreous-tinted posteriorly. *Hindwing* with the discal bright brown line having a brown point projecting between the lower radial and upper median veinlet; the ocelli conspicuously larger than those in *L. Hyrania*.

Expanse, ♂ $2\frac{1}{8}$ to $2\frac{2}{8}$, ♀ $2\frac{1}{8}$ to $2\frac{3}{8}$ inches.

HABITAT.—Sikkim; Bhotan; Naga Hills; Khasia Hills.

DISTRIBUTION.—“Not uncommon in the virgin forests of Sikkim, from 7000 to 9000 feet, between June and November” (Elwes, Tr. Ent. Soc. 1888, 314). Mr. O. Möller obtained it in Sikkim in August. Mr. L. de Nicéville (J. A. S. Beng. 1888, 93) records the capture of “a male on Senchal, at 7000 feet, in October.” Specimens were taken in Buxa, Bhotan, by Mr. Knyvett’s native collectors (De Nicéville, J. A. S. Beng. 1886, 250). Major Godwin-Austen obtained it in the Khasia Hills. Specimens from the Khasia Hills are in the collection of Colonel C. Swinhoe. It was taken by Mr. W. Doherty in the “Naga Hills, 5000 to 7000 feet, from June to September” (P. Z. S. 1891, 264).

LETHE BRISANDA (Plate 85, figs. 3, 3a, ♂ ♀).

Lethe Brisanda, De Nicéville, Journ. Asiatic Soc. Bengal, 1886, p. 249, pl. xi., fig. 13, ♀; *id.* Proc. Zool. Soc. Lond. 1887, p. 451, pl. 39, fig. 8, ♂.

IMAGO.—Male. Upperside castaneous-brown. *Forewing* crossed by an indistinct slightly-oblique discal pale outer-bordered dusky sinuous line, beyond which is a pale costal spot, and below the latter are three of the small blackish ocelli of the underside indistinctly visible. *Hindwing* with six submarginal indistinct blackish pale-bordered ocellated spots, the upper second being most distinct and blackest, the lower fourth and fifth with a slight white pupil; a marginal pale line with dusky inner border. Underside paler brown; both wings crossed by a dark brown sub-basal line, and an outer short line crossing the cell of forewing with an intervening lilac band. *Forewing* with an oblique discal narrow straight lilac band of equal width throughout its length; beyond are four small black ocelli, each with a white pupil,

a brown and a ferruginous ring, and then an outer pale ring; marginal line pale bordered. *Hindwing* with a transverse discal dark brown line acutely angulated on the median veinlets, followed by a series of six prominent ocelli, each with a black centre and white pupil, an ochreous, then a dark brown, and an outer violaceous ring.

Female. "Upperside castaneous. *Forewing* with rather more than the outer half fuscous, crossed from the middle of the costa to near the anal angle by a decreasing white band, which is tinged with ochreous anteriorly, its inner edge very straight and sharply defined, its outer edge less regular and blurred; two small ochreous subapical spots divided by the fifth subcostal nervule. *Hindwing* with the outer half fuscous, bearing a submarginal series of four black spots placed upon a castaneous band, the upper one large and round, the second somewhat quadrate and extending to the inner of the two pale marginal fine lines, the third and fourth small and oval; there are faint traces also of a spot in the discoidal and a geminated one in the submedian interspace. Underside pale ochreous-brown. *Forewing* with two ferruginous fine lines crossing the middle of the cell, the discal band as above but somewhat lengthened posteriorly, the ground colour within it somewhat darker than the rest of the wing; a submarginal series of four small perfect ocelli, made up of a white pupil, a black ring, a ring of the ground colour, a ferruginous ring, and an outer pale ring; two fine dark marginal lines. *Hindwing* with two discal fine irregular ferruginous lines from the costa to the submedian veinlet, the lower discocellular veinlet ferruginous; a submarginal series of six perfect ocelli, made up of a black white-pupilled centre, an ochreous ring, a dark brown ring, and then an outer violaceous ring, the upper ocellus much the largest, the second and fourth subequal, as are also the third and sixth, which are the smallest, the latter twinned; two fine dark marginal lines inwardly defined by a pale violet line and enclosing a fine ochreous line. *Cilia* pale brown throughout."

Expanse, ♂ $2\frac{2}{3}$, ♀ $2\frac{3}{8}$ inches.

HABITAT.—Buxa, Bhotan.

The male differs above from Sikkim specimens of *L. Dinarbas* in the decidedly less obliquity of the pale-bordered discal line of the forewing, and "on the underside of the forewing in the lilac band across the cell being much narrower, with uneven instead of straight edges; the discal oblique band lilac throughout, straight, and of equal width throughout (in *L. Dinarbas* the upper portion of the band only is lilac, this portion too in that species being wider); in having an additional ocellus in the subcostal interspace (in *L. Dinarbas* there are always three ocelli only). On the hindwing the discal bands are deep brown instead of ferruginous, and the lilac washings throughout much more brilliant. The female differs from the same sex of *L.*

Dinarbas on the upperside, in having the ground colour castaneous instead of pale brown, the discal band straighter and better defined; the ocelli on the hindwing smaller and blind. On the underside the ground colour in *L. Brisanda* is ochreous, in *L. Dinarbas* it is pale brown washed with violet; the forewing has four ocelli owing to the discal band being narrower, in *L. Dinarbas* there are three only; on both wings in the latter the discal narrow lines are dark brown instead of ferruginous and broader and more regular."

A male and female obtained near Buxa, Bhotan, by Mr. A. V. Knyvett's native collectors. *L. Dinarbas* also occurs at Buxa.

The illustrations of this species on our Plate No. 85, fig. 3, represent the male type, kindly lent by Mr. H. J. Elwes, and fig. 3a, the female, reproduced from Mr. L. de Nicéville's figure of the type specimen.

INDO-MALAYAN AND ALLIED SPECIES OF *LETHE*.—*L. Arete* (Cramer, Pap. Exot. iv. pl. 313, figs. E.F. (1782). Both sexes of this species are in our own collection. *Habitat.* Amboina.—*L. Arcuata*, Butler, Catal. Satyr. Brit. Mus. p. 114, pl. 2, fig. 3 (1868), ♂. Quite a distinct species from *L. Arete*. Both sexes are in our own collection. *Habitat.* Celebes.—*L. Darena*, Felder, Reise Nov. Lep. iii. p. 498, pl. 68, fig. 4, 5 (1867). *Habitat.* Java.—*Lethe Whiteleyi*, Butler, Ann. Nat. Hist. 1867, p. 403, pl. 9, fig. 8. *Habitat.* Japan.—*L. Diana*, Butler, Journ. Linn. Soc. 1866, p. 55, *id.* Ann. N. H. 1867, pl. 2, fig. 2. Oberthür, Etudes Ent. vi. p. 16, pl. 7, fig. 2, ♀. *Habitat.* Japan; China; Corea.—*L. consanguis*, Butler, Ann. Nat. Hist. 1881, p. 133. *Habitat.* Japan.—*L. procris*, Leech, Entomologist, 1891, p. 2. *Habitat.* W. China.—*L. Baucis*, Leech, Entomologist, 1891, p. 3. *Habitat.* W. China.—*L. Syrcis*, Hewitson, Exot. Butt. iii. Debis pl. 3, figs. 13, 14 (1863). Oberthür, Etudes Entom. vi. pl. 7, fig. 3 (1881). *Habitat.* China.—*L. occulta*, Leech, Entomologist, 1890, p. 28. *Habitat.* W. China.—*L. labyrinthea*, Leech, *id.* p. 28. *Habitat.* W. China.—*L. Helena*, Leech, *id.* 1891, p. 3. *Habitat.* W. China.—*L. gemina*, Leech, *id.* 1891, p. 24. *Habitat.* W. China.

The following are allied Chinese forms:—Gen. nov. *Archondesa*. Male. Forewing very short, broad, triangular; costa slightly arched, apex obtuse, exterior margin slightly oblique and hardly concave, posterior angle obtuse; cell moderately narrow, extending to half the wing. *Hindwing* broad, short, somewhat triangular; exterior margin oblique and produced posteriorly, abdominal margin long; cell narrow and long. Palpi compactly clothed in front with short thick-set hairs, apical joint short, obtuse; antennæ very long, with an elongated imperceptibly thickening club. Type *A. lanaris* (*Lethe lanaris*, Butler, Ann. Nat. Hist. 1877, p. 95). *Habitat.* China.—Gen. nov. *Choranesa*. Male. *Forewing* narrow, subtriangular; costa slightly arched, apex obtuse, exterior margin even, posterior angle rounded; cell broad, extending to half the wing. *Hindwing* bluntly ovate; exterior margin convex and very slightly angular at end of the upper median veinlet;

abdominal margin long; cell long, narrow; discocellulars long, very oblique. Palpi short, porrect, clothed with short dense velvety hairs; apical joint pointed; antennæ with a well-formed blunt-tipt club. Type *C. trimacula* (Lethe trimacula, Leech, Entomologist, 1890, p. 27). *Habitat.* W. China. This latter species is here placed near *Debis* with doubt; its pattern above is peculiar, and that on the underside of the hindwing is very different; there are also seven ocelli present, the two upper being geminated.

Genus DIONANA.

IMAGO.—Male. Wings large. *Forewing* triangular; costa much arched, apex obtusely pointed, exterior margin oblique, slightly wavy, posterior angle rounded, posterior margin straight; cell short, less than half length of the wing, broad; first and second subcostal branches emitted before end of the cell; discocellulars outwardly-oblique, upper short and angled close to subcostal, concave below the angle, radials from the angles; median branches equidistant apart. *Hindwing* broadly ovate, costa arched in the middle, apex rounded, exterior margin convex, sinuous, broadly angular at end of middle median veinlet; cell broad, fusiform; first subcostal branch emitted at nearly one-third before end of cell; discocellulars long, outwardly-oblique, radial from the middle; two upper medians from end of the cell, lower at about one-fourth before the end. *Thorax* stout, densely hairy; palpi narrow, hairy in front, apical joint short, slender; legs rather long, stout, middle and hind femora slightly hairy beneath; antennæ long, with elongated very slender club; eyes hairy.

Type.—D. *Margaritæ*.

DIONANA MARGARITÆ (Plate 86, figs. 1, 1a, b, ♂ ♀).

Lethe Margaritæ, Elwes, Proc. Zool. Soc. 1882, p. 405, pl. 25, fig. 1, ♂.

Neorina Margaritæ, Marshall and de Nicéville, Butt. of India, etc. i. p. 136, ♂. Elwes, Trans. Ent. Soc. Lond. 1888, p. 307.

IMAGO.—Male. Upperside olivescient ochreous-brown; marginal lines blackish, ochreous bordered; cilia pale ochreous. *Forewing* crossed by an ochreous-yellow oblique discal narrow band, which terminates just below the lower median veinlet, is crossed by brown veins, and slightly sinuous anteriorly on its outer edge; beyond is a subapical series of four ochreous-ringed black spots and a contiguous upper costal ochreous spot. *Hindwing* with a submarginal series of five large black ocelli, each with a narrow ochreous ring, and the two lower with a white pupil. Underside paler, but brighter olivescient ochreous-brown; marginal lines pale olivescient-ochreous bordered. *Forewing* with the oblique discal band more prominent and paler yellow; there are five prominent submarginal ocelli, each with a small black centre, a white pupil, a yellow ring, then a brown ring, and all encompassed within an outer yellow band. *Hindwing* crossed by a slightly-

incurved moderately broad yellow discal band, and a submarginal series of six very prominent ocelli, of which the upper is very large, the fifth also large, the sixth duplex, each with black centre, a white pupil, ochreous-yellow ring, then a dark brown ring, the upper one being encircled by an outer yellow ring, and the others encompassed by a yellow outer ring.

Female. Upperside darker brown. *Forewing* crossed by a much broader and more oblique paler yellow band, which also broadly extends to the posterior margin just before the angle; the ocelli and contiguous costal spot present but much less defined. *Hindwing* marked as in the male, the ocelli being somewhat larger and the exterior margin with a broader and more pointed angle at end of the middle median. Underside of the same colour as in the male; marginal bordered-lines the same. *Forewing* with the oblique pale yellow band as on upperside; five ocelli as in the male, and the middle of the cell is crossed by a narrow pale yellow band. *Hindwing* with the yellow transverse discal band and ocelli as in the male. *Body* beneath and legs pale brownish-ochreous; legs paler beneath; palpi at the sides pale ochreous; antennæ reddish-ochreous, with black subterminal band.

Expanse, ♂ $3\frac{2}{3}$, ♀ $3\frac{1}{3}$ inches.

Habitat.—Bhotan.

This beautiful species was obtained by Mr. Knyvett's native collectors near Buxa, in Bhotan.

Our illustrations of this species on Plate No. 86, figs. 1, 1a, b, represent the male and female, from the type specimens kindly lent for this purpose by Mr. L. de Nicéville and Mr. H. J. Elwes.

DIONANA NAGA (Plate 86, fig. 2, ♀).

Lethe Naga, Doherty, Journ. Asiatic Soc. Bengal, 1889, p. 123, pl. x. fig. 4, ♀.

"Female. Upperside dark fuscous. *Forewing* with a broad white oblique band from the costa (near which it is broader and whiter) to the submedian, above which it is suddenly bent downwards, passing close by the end of the cell but not touching it, its inner border distinct, its outer diffused. *Hindwing* with two pale submarginal lines, the ocelli showing through the wing, especially the white pupil of the fifth. Underside uniform light fuscous-brown with a slight bronzy lustre. *Forewing*. Base unmarked except by a very obscure darker line across the cell, the white band as above, two straight pale submarginal lines, and five perfect subequal ocelli ringed with pale violet, set in nearly a straight line between the lower median and the lower subcostal branch. *Hindwing* with two irregular transverse darker lines placed unusually close together, and enclosing a narrow space obscurely glossed with violet. These lines originate below the costal vein, the inner crossing the cell

at the origin of the upper discocellular, and continuing parallel with it to the hind margin of the cell halfway between the forkings of the median vein, continued obscurely through the submedian space; the outer line runs in a parabola from the costal vein to the upper median, skirting but not touching the end of the cell, and, crossing the base of the upper median space, disappears above the last ocellus. Ocelli six, all perfect, large, with white pupils surrounded by black and ochreous and set in a large violet-whitish ring; the first ocellus is within the line of the others, and is extremely large, the next three subequal, the next larger, the sixth geminate, with two separate white-pupilled black spots in a yellow field; two wavy submarginal pale lines."

Expanse, ♀ $3\frac{1}{4}$ inches.

HABITAT.—Margherita, Upper Assam.

A single female of this species was obtained by Mr. W. Doherty, near Margherita, during his collecting tour on the Upper Assam frontier, between August and December.

Our illustration of this species on Plate No. 86, fig. 2, is a reproduction of the figure of Mr. Doherty's female, as above quoted.

Genus TANSIMA.

Tansima, Moore, Trans. Ent. Soc. Lond. 1881, p. 305.

Lethe (group 3 part), Marshall and de Nicéville, Butt. of India, etc., i. p. 157 (1883).

IMAGO.—Male. Wings short, broad. *Forewing* with the costa very much arched from the base, apex obtusely rounded, exterior margin very slightly oblique and hardly convex, posterior margin almost as long as the anterior, nearly straight; cell broad, extending a little beyond half length of the wing; first and second subcostal branches starting from near end of the cell; discocellulars outwardly oblique, upper angled near the subcostal and concave below, the lower slightly concave anteriorly, radials from the angles. *Hindwing* broadly oval; anterior margin long and arched from the base, apex obtuse, exterior margin oblique, convex posteriorly, very slightly wavy; cell broadly triangular; lower discocellular terminating immediately beyond the middle median veinlet. *Body* rather short; palpi long, narrow, second joint reaching above the head, clothed in front with rather long porrect hairs, apical joint narrow, clothed with much shorter hair in front; middle and hind legs slender, naked; antennæ slender, with an elongated pointed club; eyes hairy.

Type.—T. *Satyrina*.

TANSIMA VERMA (Plate 86, figs. 3, 3a, b, ♂ ♀).

Satyris Verma, Kollar, in Hügel's Reise Kaschmir, iv. 2, p. 447, pl. 16, figs. 1, 2 (1844).

Debis Verma, Westwood, in Doubleday and Hewitson's Gen. D. Lep. p. 360 (1851). Moore, Catal.

Lep. Mus. E. I. Compy., i. p. 217 (1857).

- Lethe Verma*, Butler, Catal. Satyr. Brit. Mus. p. 116 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 158, pl. x. fig. 23, ♂ (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 310.
- Tansima Verma*, Moore, Proc. Zool. Soc. Lond. 1882, p. 235.

IMAGO.—Male. Upperside uniformly dusky-brown, somewhat virescent tinted; marginal lines paler bordered; cilia pale brownish-cinereous. *Forewing* crossed by a broad prominent ochreous-white oblique discal band, which terminates at the lower median close to the outer margin. *Hindwing* with two or three more or less defined subanal black white-pupilled ocellate spots. Underside uniformly paler brown; marginal lines either pale ochreous or violet bordered. *Forewing* with a slender indistinct pale violet-grey sinuous line crossing middle of the cell; an oblique transverse ochreous-white band as on upperside, above which are two prominent subapical black perfect ocelli outwardly encompassed by a pale violet-grey line, which ends more prominently on the costa above them. *Hindwing* crossed by a slender undulated subbasal and an angulated discal violet-grey line, beyond which is a series of six very prominent black ocelli, the upper one and the fifth somewhat the largest, each with a white pupil, ochreous ring, a dark brown ring, and all encompassed by an outer violet-grey ring; sometimes each ocellus has a few white speckles as well as the pupil.

Female. Upper and underside as in the male, except that the oblique white band terminates below the lower median veinlet. *Body* and legs beneath pale brownish-ochreous; sides of palpi ochreous-white; antennæ black above, with ochreous tip.

Expanse, 2 to 2½ inches.

HABITAT.—N.-W. and E. Himalayas; Assam; Khasia Hills; Burma.

DISTRIBUTION.—Major H. B. Hellard, in his MS. Notes, records this species from "Masuri and Kaschmir at the end of August, September and beginning of October." Col. A. M. Lang (Ent. Mo. Mag. 1864, 182) says this insect "frequents a region about 200 miles from Kasauli, in the autumn, and affects trees, pitching on the trunks of Rhododendrons and Oaks." Mr. de Nicéville (Butt. of India, i. 158) says, "Col. Lang's specimens were taken in Lower Kunawar at an elevation of 7000 feet, and at Masuri, in the autumn. There is, however, a summer brood, as Mr. de Nicéville has taken it then commonly in Simla at about 5000 feet elevation in forest, settled on the dark rough bark of the Deodar, where, till disturbed, it is completely hidden. It was not found in Kashmir either by Baron Hügel or by Capt. B. Reed. Major C. H. T. Marshall found it extremely common in Chumbi in May, at Kujjiar." Major J. W. Yerbury (Ann. Nat. Hist. 1888, 135) records it from "Thundiani, a Hill Station (8700 feet?) near Abbottabad, in September." Mr. W. Doherty, in his list of Kumaon butterflies (J. A. S. Bengal, 1886, 117), records it from the "Lower Himalayan tract at 2500 to 6000 feet; not very

common." In the Kangra district specimens were obtained by the Rev. J. Hocking (P. Z. S. 1882, 235). Major-Gen. G. Ramsay obtained specimens in Nepal. According to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 315), it is "not uncommon in Sikkim up to 8000 feet, between April and November, but commonest at about 4000 feet in the rains." Mr. G. C. Dudgeon obtained it in Sikkim in March. Mr. de Nicéville took it in Sikkim in October, and Mr. Otto Müller in November at 4000 feet elevation" (Butt. of India, 158). The late Mr. W. S. Atkinson obtained it at Cherra Pungi, in Assam, and "Mr. J. P. Cock took it in November at Shillong;" (Butt. of India, 158). Mr. J. Jenner Weir has a specimen taken at Shillong in May. Major Godwin-Austen obtained it in the Khasia Hills. In Burma, Dr. N. Manders (Tr. Ent. Soc. Lond. 1890, 518) records it from "Bernardmyo, a Hill Station in the Shan States, at 7000 feet elevation," remarking that "it seems partial to considerable elevations, as I did not take it either at Fort Stedman, 3200 feet, or at Koni, 4500 feet." Signor Leonardo Fea recently obtained specimens in the Karen Hills, in September. Major C. H. E. Adamson (Catal. of Burmese Butterflies, p. 8) records it from the "Taoo Hills in Tenasserim, in October." Mr. O. Limborg (P. Z. S. 1878, 824) obtained it at "Moolai, 3000 to 6000 feet in Upper Tenasserim. Messrs. Elwes and de Nicéville (J. A. S. Beng. 1887, 417) record it from Tavoy.

CHINESE ALLIED SPECIES OF TANSIMA.—The type of the genus, *T. Satyrina* (Lethe Satyrina Butler, Trans. Ent. Soc. Lond. 1871, p. 402). Moore, Tr. Ent. Soc. 1881, p. 305. *Syns.* Lethe Naias, Leech, Tr. Ent. Soc. 1889, p. 100, pl. 8, fig. 4, ♂. *Mycalesis Styppax*, Oberthür, Etudes Entom. 1890, p. 44, pl. 10, fig 110, ♂. *Habitat* E. Tibet; N. and W. China.—*T. Butleri* (Lethe Butleri, Leech, Tr. Ent. Soc. 1889, p. 99, pl. 8, fig. 3). *Habitat*, W. China.—*T. turpilius* (*Mycalesis turpilius*, Oberthür, Et. Entom. 1890, p. 13, pl. 43, fig. 101). *Habitat*, Moupin, E. Tibet.—*T. Maackii* (*Lasiommata Maackii*, Bremer, Lep. Ost-Siberiene, p. 22, pl. 3, fig. 3 (1864). *Habitat*, Amurland.

Genus SINCHULA.

Lethe (group 3 part), Marshall and de Nicéville, Butt. of India, i. p. 157 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 310.

IMAGO.—Male. Wings very short, broad. *Forewing* triangular; cell extending to more than half the length; two first subcostals emitted before end of the cell; discocellulars outwardly oblique, excurved, radials from near the upper end; median branches very wide apart. *Hindwing* with the apex rounded, exterior margin convex, scalloped; cell long, extending to more than half the wing; discocellulars very oblique, slightly angular above the middle, radial from the angle; middle median emitted at some distance before lower end of the cell. Thorax hairy; palpi long,

slender, very hairy in front; middle and hind femora hairy beneath; antennæ short and with an elongated well-formed club.

Type.—S. Sidonis.

SINCHULA SIDONIS.

WET-SEASON BROOD (Plate 87, figs. 1, 1a, ♂).

Debis Sidonis, Hewitson, Exotic Butt. iii. p. 77, *Debis* pl. 3, fig. 16 (1863), ♂.

Lethe Sidonis, Butler, Catal. Satyr. Brit. Mus. p. 116 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 159 (1883). Staudinger, Exot. Schmett. p. 221, pl. 78, ♂. Elwes, Tr. Ent. Soc. Lond. 1888, p. 310.

IMAGO.—Male. Upperside dark virescent ochreous-brown, glossy; exterior border of both wings with an indistinct dusky lunular submarginal border to the marginal line; cilia brown alternated with cinereous-white. *Forewing* with a very indistinct dusky transverse discal oblique line, which is almost imperceptibly pale bordered externally at its costal end; an indistinct ochreous small costal spot before the apex. *Hindwing* with two or three, sometimes four, submarginal small black spots. Underside paler. *Forewing* with a short ill-defined darker brown pale-bordered streak across the cell, a more distinct transverse oblique discal slightly-undulated dark brown line, which is externally bordered at its costal end with a narrow lilacine-white streak, beyond which is a similar lilacine-white costal streak and three subapical superposed very small indistinct ocelli, each with a white pupil; marginal line pale bordered. *Hindwing* crossed by three slender wavy interrupted glossy lilacine-blue subbasal lines, and an entire irregular similar discal line, the latter being broadly bordered externally with dark brown, followed by a submarginal series of six ocelli, the upper one and the fifth the largest and very prominent, the sixth duplex, each with a black centre, a white pupil, an ochreous ring, a dark brown ring, and then a glossy lilacine-blue outer ring, the white pupil of the upper second, third, and fourth being blurred and blue-tinged; marginal line bordered inwardly by a prominent glossy lilacine-blue lunular line.

Female. Upperside as in the male, except that the dusky lunular submarginal border is more distinct, and on the forewing the two small ochreous costal spots also more defined. Underside as in the male. *Body* and legs beneath pale brownish-ochreous, sides of palpi white.

Expanse, ♂ $2\frac{1}{2}$, ♀ $2\frac{3}{4}$ inches.

DRY-SEASON BROOD (Plate 87, figs. 1, b, c, ♂ ♀).

IMAGO.—Male and female. Upperside of the same glossy dark olivaceous-ochreous-brown as in the wet-season brood. Both wings somewhat more scalloped.

Forewing with two similar pale ochreous costal spots. *Hindwing* with larger submarginal blackish spots; those of the female with a pale centre. Underside darker than in the wet-season brood. *Forewing* with the cell streak paler bordered, the transverse oblique discal line somewhat posteriorly angulated, more defined, and with more prominent pale lilacine-white external costal border, the outer pale descending costal spot also distinct, and the four subapical superposed ocellate spots larger and with blurred lilacine-blue centres. *Hindwing* with similar basal glossy lilacine-blue wavy lines, and marginal lunular line, the submarginal ocelli being of more uniform size, especially those of the female, and in both sexes the upper five have entirely blurred lilacine-blue centres, the lower duplex ocellus only being perfect.

Expanse, ♂ $2\frac{2}{8}$, ♀ $2\frac{3}{8}$ inches.

HABITAT.—E. Himalayas, Sikkim; Assam; Khasia Hills; Sylhet.

The *dry-season form* of *S. Sidonis* above described is distinguishable from the same form of *S. Vairarta*, on the upperside, by its general darker colour, the dusky lunular submarginal border on both wings, and somewhat larger spots on the hindwing. On the underside both sexes are also much darker coloured; the forewing having a lilacine anterior border to the discal line, this border being much less defined in both sexes, the subapical ocelli are also larger and with blurred lilacine centres; the hindwing has all the ocelli, except the lower duplex one, with large blurred lilacine-blue centres.

DISTRIBUTION AND HABITS.—In Sikkim, at from 5000 to 7000 feet elevation, Mr. L. de Nicéville took it most commonly in roads through forests, in October, and the late "Mr. Cock took it at Shillong in July" (Butt. India, 160). Specimens in the late Mr. W. S. Atkinson's collection were labelled Darjiling and Cherra. According to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 316) this is "the commonest species of *Lethe* in Sikkim in the zone of forest from 4000 to 8000 feet, between April and November, where it is constantly seen flitting along the forest paths, and settling both on the ground and on low vegetation. The female seems much rarer, and probably flies but little. Sikkim specimens show the markings of the hindwing below of a much more distinct and brilliant violet than those from Mandi in the N.-W. Himalayas [wet-season brood of *Vairarta*], and are rather smaller and less brilliant than those I took in the Khasias." Specimens of both sexes obtained by Mr. Otto Möller in Bhotan, in August, are in Mr. J. H. Leech's collection. Specimens from the Khasia Hills are in the collection of Colonel C. Swinhoe.

Of the illustrations of this species on our Plate No. 87, figs. 1, 1a, represent the male of the wet-season brood, and figs. 1, b, c, the male and female of the dry-season brood.

SINCHULA VAIVARTA.

WET-SEASON BROOD.

IMAGO.—Both sexes differ from the wet-season form of *S. Sidonis* in having the forewing less triangular, the apex being more obtusely rounded, and the exterior margin less oblique; the hindwing also is comparatively more convex externally and less scalloped; cilia dusky, alternated with cinereous-white. Upperside of the same colour as in *S. Sidonis*, except that the dusky lunular submarginal border is absent; the forewing not possessing a visible dusky oblique transverse discal line which is apparent in *S. Sidonis*, and the apical costal pale spot only is very indistinctly present. Underside similar to the wet-season form of *S. Sidonis*, except that, on the forewing, the bar across the cell is more or less obsolescent, the transverse discal darker brown line is more convex and comparatively less oblique and its costal end is less externally pale bordered; the outer costal spot above the small ocelli is also less defined. Hindwing similar to *S. Sidonis*, the glossy lilacine-blue lines being less prominent.

Expanse, ♂ ♀ 2 to 2½ inches.

DRY-SEASON BROOD (Plate 87, fig. 2, 2a, b, c, ♂ ♀).

Lethe Vairarta, Doherty, Journ. Asiatic Soc. Beng. 1886, p. 115, ♂ ♀.

IMAGO.—Shape of wings very much as in *S. Sidonis*, except that on the hindwing the angle at end of upper median branch is obsolescent, and those at the ends of the lower medians are more produced. Male. Upperside glossy olivescient ochreous-brown; cilia alternated with cinereous-white. Forewing with two dull ochreous costal spots, and a faint trace of a pale oblique transverse discal band from the inner spot. Hindwing with five distinct black submarginal spots. Underside somewhat paler olivescient-brown than the upperside. Forewing with a pale bar across the cell, a distinct transverse discal line with yellowish anterior-bordering fascia; a pale lilacine-white costal spot at the furcation of last subcostals, below which are four very indistinct brown ocellate-spots with minute lilacine pupils. Hindwing with three irregular subbasal, and a discal lilacine line, the latter exteriorly bordered by darker brown; six submarginal ocelli, the last duplex, the second, third, and fourth being less prominent than the others and with a small lilacine pupil; submarginal lilacine lunular line indistinct anteriorly. Female. Upperside somewhat paler than the male. Forewing with the inner costal spot and discal pale fascia much more distinct; the subapical spot and four lower pale minute ocelli also visible. Hindwing with the submarginal black spots slightly pale ringed. Underside as in the male, except that on the forewing the oblique discal fascia is broader, and the subapical spot and four lower small ocellate spots more distinct; and on the hindwing the ocelli are somewhat larger.

Expanse, ♂ 2½, ♀ 2½ inches.

HABITAT.—N.-W. Himalayas.

The description of the male and female of the dry-season form here given is taken from Mr. Doherty's typical specimens kindly forwarded for our examination by Mr. L. de Nicéville.

In the original description Mr. Doherty adds (l. c. p. 116) the "prehensores close to those of *Sidonis*. The uncus, however, is more bent down, appearing truncate from above, and flattened laterally, while in *Sidonis* it appears acute from above and is cylindrical. In both species the uncial branches viewed from the side are distant from the uncus, and much shorter, and come to meet it at an angle, while in *Maitrya* the uncus and its branches are nearly equal, nearly parallel, and approximate. The clasp also is simply hooked instead of being set with numerous barbs as in *Sidonis* and *vaivarta*."

Our illustrations of this species on Plate No. 87, figs. 2, 2a, b, c, represent the male and female of the dry-season brood, taken from typical specimens kindly lent for this purpose by Mr. L. de Nicéville.

DISTRIBUTION.—Specimens of the *wet-season form*, taken by Colonel A. M. Lang at Masuri, 7000 feet, in June, 1868, are in our collection. The Rev. J. H. Hocking (P. Z. S. 1882, 235) obtained it in Kangra. Mr. A. Graham Young (Butt. Ind. 160) "took specimens on the Tihir Pass in Kulu, in July." Capt. H. B. Hellard (MS. Notes) records it from "Ketruan, in Valley of Rupin River, in September." Mr. W. Doherty (J. A. S. Beng. 1886, 115) probably refers to the wet-season form of this species under his *L. Sidonis*, as being taken by him at Naini Tal, 6000 to 7000 feet; small specimens, and a large dark variety at Khāti, N.-W. Kumaon, 7000 to 8000 feet." Of the *dry-season form* (*vaivarta*) Mr. W. Doherty (l. c. p. 115) obtained both sexes at "Dhankuri, Khāti, Dwāli, in N.-W. Kumaon; and near Khela in East Kumaon, 7000 to 11,000 feet, in the cold season."

SINCHULA NICETELLA (Plate 88, fig. 2, ♂).

Lethe Nicetella, de Nicéville, Proc. Zool. Soc. Lond. 1887, p. 418, pl. 39, fig. 5, ♂. Erwes, Trans. Ent. Soc. Lond. 1888, p. 310.

IMAGO.—Male. Upperside dark olivescient ochreous-brown, glossy, and when fresh with a brilliant golden-bronzy sheen; the outer borders with a regular dusky band devoid of this gloss; cilia alternated with cinereous-ochreous. *Forewing* with a very indistinct short subapical pale ochreous streak at the bifurcation of fourth and fifth subcostal veinlets. *Hindwing* with a submarginal series of five round black spots, each with slightly pale outer ring, the upper second being the largest. Underside paler. *Forewing* with an obscure dusky bar across middle of the cell, a transverse oblique discal pale olivescient-lilacine fascia, which is most prominent at its costal end and becomes obsolete posteriorly; a subapical similar pale descending fascia which is more lilacine-white at its costal end; marginal line pale bordered, but obsolescent hindward. *Hindwing* with three subbasal and a discal glossy lilacine

wavy line, the latter with an outer bordering darker-brown shade; a submarginal series of six ocelli, of which the upper first and the fifth are somewhat the largest, the first, second, and fifth and the duplex sixth composed of a pure black centre, white pupil, an ochreous ring, a dark brown ring, and then an outer glossy lilacine ring; the third and fourth having a lilacine pupil, a lilacine ring with outer rings as in the others; marginal line ochreous-bordered externally and internally by a glossy lilacine lunular line with triangular anal spot.

Female. Upperside. Both wings paler. *Forewing* with the discal fascia of the underside visible. Underside paler; markings as in the male. *Body* above and beneath, forelegs, and femora beneath, clothed with glossy green and ochreous-red hairs; middle and hind legs and fore tarsi ochreous-brown; palpi above and beneath blackish, lateral streak whitish; collar white; antennæ reddish-ochreous, subterminal band black.

Expanse, ♂ ♀ $1\frac{1}{8}$ to 2 inches.

HABITAT.—Sikkim.

DISTRIBUTION.—Mr. L. de Nicéville (P. Z. S. 1887, 419) records "a large series of male and a single female collected in Sikkim by Mr. Otto Möller." Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 317) says, "I found this much commoner in Sikkim than L. Nicetas, the males being abundant along the Goompahar and the flanks of Tonglo, from 7000 to 8000 feet or upwards, in July and August. They settle on the roads in wet places on shady paths, but the female is very much rarer, and I only procured a single good specimen, which differs little from the male."

SINCHULA SIDEREA (Plate 88, fig. 3, 3a, ♂).

Lethe Siderea, Marshall, Journ. Asiatic Soc. Bengal, 1880, p. 246. Marshall and de Nicéville, Butt. of India, etc., i. p. 159 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 310, pl. 9, fig. 3, ♂.

IMAGO.—Male. Upperside dark glossy olivescient ochreous-brown; cilia dusky, alternated with cinereous. *Forewing* unmarked. *Hindwing* with a faint dusky marginal line and broad dusky submarginal border. Underside of a uniform duller brown. *Forewing* entirely wanting the discal band and the whitish costal spots, the only markings being three minute submarginal white spots beyond the cell, the middle one being faintly ringed with black; marginal line exteriorly bordered with ochreous and inwardly bordered by a slender glossy lilacine-blue submarginal line, both extending only to the middle median veinlet. *Hindwing* with three prominent irregular subbasal and a discal glossy lilacine-blue line, the former being inwardly bordered and the latter outwardly bordered by dark brown; followed by six prominent ocelli, the upper one and the fifth the largest, the lowest duplex, each with a black centre, white pupil, a reddish-ochreous ring, a brown ring, and then an outer glossy lilacine-blue ring; marginal line outwardly reddish-ochreous and

inwardly bordered by a very slender glossy lilacine-blue line throughout its length. *Body*, forelegs and femora beneath clothed with glossy greenish and reddish hairs; legs ochreous-brown above; palpi clothed with blackish hairs, sides whitish streaked; collar white; antennæ blackish above, ochreous-red beneath, subterminal band black. Female unknown.

Expanse, ♂ 2 to $2\frac{1}{8}$ inches.

HABITAT.—Sikkim.

DISTRIBUTION.—Mr. L. de Nicéville (Butt. Ind. 159) records "two specimens of this species from Sikkim." According to Mr. J. H. Elwes (Tr. Ent. Soc. 1888, 315) "this species has hitherto only been found on Tendong, in Native Sikkim, by Mr. Otto Möller's native collectors at about 7000 feet, in the rainy season. The female remains unknown. In 1886 it was taken as late as November."

Our illustrations of this species on Plate No. 88, figs. 3, 3a, represent the male from a specimen kindly lent for this purpose by Mr. H. J. Elwes.

SINCHULA MAITRYA (Plate 88, figs. 1, 1a, ♂ ♀).

Lethe Maitrya, de Nicéville, Journ. Asiatic. Soc. Bengal, 1880, p. 245, ♂. Marshall and de Nicéville, Butt. of India, etc. i. p. 160, pl. x. fig. 20, ♂ (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 310.

IMAGO.—Male. Upperside dark olivescient ochreous-brown, with a golden-bronzy gloss when fresh; cilia alternated with ochreous-white. *Forewing* crossed by a dusky brown discal fascia, which is anteriorly pale-ochreous macularly-bordered, the fascia being almost erect posteriorly and curved at its costal end; before the apex is a small ochreous oblique costal spot, intersected by the subcostals. *Hindwing* with three, or four, small dusky black submarginal spots. Underside with the forewing somewhat paler olivescient-brown; the hindwing being darker brown. *Forewing* with a pale olivescient-ochreous curved bar across middle of the cell, a transverse discal anteriorly-curved almost macular fascia bordering the discal line; beyond is a more whitish costal descending streak and three lower minute obsolescent ocelli; and then a narrow ochreous submarginal fascia bordering the marginal line. *Hindwing* crossed by three interrupted wavy subbasal and an entire discal glossy lilacine-white line, the latter outwardly bordered by a broad darker brown shade; a submarginal series of six uniformly-sized ill-defined blurred olivescient-brown ocelli, the sixth duplex, each with a large blurred lilacine-speckled centre and white pupil, an indistinct brown ring and a narrow glossy lilacine outer ring; a slender submarginal glossy lilacine line ending in a large triangular anal spot.

Female. Upperside somewhat paler; cilia alternated with pale ochreous. *Fore-*
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wing crossed by a pale ochreous excurved discal narrow macular band, the five lower portions being dentate and less defined; a prominent costal spot and two lower less-defined denticulate marks. *Hindwing* with three upper submarginal dusky black spots. Underside brighter coloured; the forewing more olivescens and the hindwing more ochreous in tint. *Forewing* with a prominent curved pale olivescens-ochreous bar within the cell, transverse discal macular band, paler subapical descending streak and lower white dots. *Hindwing* with the basal area between the transverse lilacine lines speckled with lilacine scales, the outer bordering shade to the discal line being distinct; the ocelli as in male; marginal line ochreous and inwardly bordered by the slender glossy lilacine line and its anal triangular spot. *Body* beneath, and legs pale brownish-ochreous; collar white; sides of palpi ochreous-white; antennæ reddish-ochreous, with black subterminal band.

Expanse, ♂ 2 to $2\frac{1}{2}$, ♀ $2\frac{1}{8}$ to $2\frac{3}{8}$ inches.

HABITAT.—N.-W. and E. Himalayas; Bhotan.

DISTRIBUTION.—In the N.-W. Himalayas, Mr. L. de Nicéville (Butt. Ind. 161) "obtained the male on the Jalouri Pass, at about 8000 feet elevation, in July; and in Colonel A. M. Lang's collection there is a male from Narkunda on the Hindustan and Tibet Road, taken in July." Mr. W. Doherty (J. A. S. Beng. 1886, 115) records it from "Dhánkuri and Kháti in Western Kumaon, and Sosa in Eastern Kumaon, at 7000 or 11,000 feet." In Sikkim, "a male and two females were taken by the late Dr. T. C. Jerdon, these Sikkim specimens being somewhat smaller than those from the N.-W. Himalayas" (Butt. Ind. 161). Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 316) says "this species is very abundant on Tonglo and along the Singalelah Range between Sikkim and Nepal, from 9000 to 12,000 feet, in July and August, where it keeps company with *Zophoessa Jalowrida*, as in the north-west. I also found it on the Rishilab, in British Bhotan, at 10,000 feet, and my native collectors brought it in great numbers from Bhotan in 1884. *L. Maitrya* is a forest-haunting insect, and has exactly the same habits as *Z. Jalowrida*. The female is very rare, and I have only procured one of the sex."

SINCHULA NICETAS (Plate 88, figs. 4, 4a, b, c, ♂ ♀).

Debis Nicetas, Hewitson, Exotic Butt. iii. p. 78; *Debis* pl. 3, figs. 17, 18 (1863), ♀.

Lethe Nicetas, Butler, Catal. Satyr. Brit. Mus. p. 116 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 161 (1883). Elwes, Tr. Ent. Soc. Lond. 1888, p. 310.

IMAGO.—Male. Upperside dark olivescens ochreous-brown, glossy; cilia alternated with pale cinereous. *Forewing* crossed by an oblique discal indistinct dusky waved-fascia, which is broadest anteriorly and does not extend beyond the lower median veinlet, and is indistinctly macularly-bordered externally with ochreous; beyond is a small oblique ochreous costal spot before the apex. *Hindwing* with five

submarginal blackish spots, of which the upper second is the largest. Underside pale olivescient ochreous-brown. *Forewing* crossed by a prominent oblique discal excurved irregular darker brown line, externally bordered by a decreasing pale yellow fascia; beyond is a narrow descending costal pale yellow streak and two small distinct subapical ocelli; marginal line medially-bordered internally by a pale yellow line. *Hindwing* crossed by three subbasal and a discal slender indistinct lilacine zigzag line; their interspaces indistinctly speckled with lilacine scales, the former narrowly bordered inwardly and the latter broadly bordered outwardly by darker ochreous-brown, and the dark brown border of the latter line again bordered by pale ochreous, beyond which is a submarginal series of six prominent nearly equal-sized ocelli, the sixth being duplex, each with a black centre and white pupil, a yellow ring, a dark brown ring, and then an outer lilacine ring; the outer border darker ochreous-brown; the marginal line outwardly bordered with reddish-ochreous, and inwardly by a prominent glossy-lilacine lunular line ending in a triangular anal spot.

Female. Upside darker. *Forewing* with the apical half dusky-brown; crossed by an excurved oblique and somewhat indistinctly-defined narrow macular ochreous band; an ochreous costal spot intersected by the subcostal veins, below which are two small ochreous spots. *Hindwing* with the four, or five, submarginal black spots larger, more distinct, and pale ringed; marginal line bordered with reddish-ochreous. Underside paler, but brighter coloured than in the male. *Forewing* with the discal curved-band ochreous-yellow, more defined, and macular; three subapical small ocelli present, each with lilacine-white centre. *Hindwing* as in the male, but more prominently marked. *Body* above clothed with glossy greenish and reddish-ochreous hairs, paler beneath; legs brownish-ochreous; sides of palpi and collar whitish; antennæ blackish above, reddish-ochreous beneath, subterminal band black.

Expanse, ♂ $1\frac{7}{8}$ to $2\frac{1}{8}$, ♀ 2 to $2\frac{1}{8}$ inches.

HABITAT.—N.-W. and E. Himalayas.

DISTRIBUTION.—In the N.-W. Himalayas it was obtained by the Rev. J. H. Hocking in Kulu (P. Z. S. 1882, 235), and "Mr. A. Graham Young has also taken it in Kulu, in May, July, and October, but never plentifully, and those taken are much smaller than specimens from the Eastern Himalayas" (Butt. Ind. 161). Mr. L. de Nicéville (Butt. Ind. 161) records it as being "found at from 3000 to 6000 feet in suitable localities in the Himalayas from Kulu to Sikkim, not being common anywhere, and is rarer in the West than in the East." Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 317) records it as "rare in July on the Goompahar Ridge near Darjiling, in virgin forest, at from 7000 to 8000 feet. Has also been taken by Mr. Knyvett on Sinchul, in June and August."

SINCHULA VISRAVA (Plate 89, figs. 1, 1a, b, c, ♂ ♀).

Debis Visrava, Moore, Proc. Zool. Soc. Lond. 1865, p. 768, pl. 41, fig. 4, ♂.

Lethe Visrava, Butler, Catal. Satyr. Brit. Mus. p. 116 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 161 (1883). Elwes, Trans. Ent. Soc. Lond. 1888, p. 310.

Debis Deliadæ, Hewitson, Ent. Monthly Mag. 1872, p. 84, ♀.

Lethe Deliadæ, Marshall and de Nicéville, Butt. of India, etc. i. p. 162, ♀.

IMAGO.—Male. Upperside dull virescent-brown; cilia white. *Forewing* with a very faint trace of a zigzag transverse discal line, beyond which the outer border is greyish tinged; before the apex is an excurved series of four very small black spots with white pupils; marginal line inwardly bordered by a prominent white line. *Hindwing* with an outer series of six blackish spots, the first, second, fourth and fifth large, the two others small, the sixth duplex, each being bordered inwardly by a pale half-ring, and all outwardly by a broad continuous white border with sinuous outer edge, the slender black marginal line also inwardly bordered by a prominent white line and outwardly by brownish-white. Underside paler virescent-brown. *Forewing* with the posterior border more dusky-brown and defined outwardly by the discal zigzag line; three prominent well-formed small subapical brown ocelli, each with a lilacine-white pupil and outer ring; marginal line with a prominent lilacine-white inner border, its outer border being brownish-ochreous. *Hindwing* crossed by four prominent subbasal and a discal interrupted wavy glossy lilacine-white line; six very prominent ocelli, the upper one and the fifth being the largest, the sixth duplex, each with a jet-black centre and white pupil, an ochreous ring, a dark brown ring, and then an outer glossy lilacine-white ring, the outer portion of the latter ring on the second, third, fourth and fifth being broad and sinuous; a marginal slender black line with prominent glossy lilacine-white inner border and ochreous outer border. *Body* beneath pale brownish-cinereous; legs brown above, cinereous beneath; tarsi blackish with whitish bands; sides of palpi and collar white; antennæ blackish, annulated with white, club reddish, band black.

Female. Upperside white. Cilia white. *Forewing* with the basal half of the costal border, including the cell and a little beyond it, and also a continuous triangular spot at the basal interspace of the two upper median veinlets dark rufous-brown; the apical border broadly and obliquely, with the outer border including a rounded spot near the posterior angle, also rufous-brown; curving before the apex is a small tridentate white spot and two lower minute black ocelli dotted with white, beyond which is a slender pale submarginal line. *Hindwing* with an outer series of seven dark rufous-brown blind ocellated spots, the upper first, second, fourth and fifth large, the others small; a submarginal interrupted lunular brown line; the marginal line with ochreous-yellow outer border. Underside white; with similar brown markings as on upperside, except that these are much less distinctly defined;

the spots on the hindwing being replaced by perfect ocelli, each of which have a black centre, a white pupil, and a broad ochreous outer ring; and the submarginal lunular line and marginal bordering line is ochreous. Body pale-brown above, white beneath; legs pale ochreous-white beneath; palpi clothed with brown hairs, side streak white; collar white; antennæ reddish-ochreous, annulated with white, with blackish subterminal band.

Expanse, ♂ 2 to $2\frac{2}{3}$, ♀ $2\frac{2}{3}$ inches.

HABITAT.—Sikkim; Bhotan.

DISTRIBUTION.—According to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 318), "It is extremely rare in Sikkim, where Mr. Otto Möller procured a single female in June. In Bhotan, however, it is commoner, as Mr. Knyvet's collectors procured several males in June on the hills, two or three marches north of Buxa."

Of our illustrations of this species on Plate No. 89, figs. 1, 1a, represent the male, and figs. 2, 2a, the female, the latter taken from the specimen captured by Mr. Möller, and now in the collection of Mr. J. H. Leech.

INDO-MALAYAN AND CHINESE ALLIED SPECIES OF *SINCHULA*.—*S. Dataensis* (Debis Dataensis, Semper, Reise Archipel. Philip. Lep. p. 57, pl. xi. fig. 4, ♂, 1886). *Habitat*, Luzon, Philippines.—*S. Moupinensis* (Debis Moupinensis Poujade, Bull. Soc. Ent. France, 1884, p. cxl.). *Habitat*, E. Tibet.—*S. Violaceopicta* (Debis violaceopicta, Poujade, id. 1884, p. clviii.). *Habitat*, E. Tibet.—*S. Titania* (Debis titania, Leech, Entomologist, 1891, p. 67). *Habitat*, W. China.—*S. Calisto* (Debis Calisto, Leech, Entomologist, 1891, p. 23). *Habitat*, W. China.

Genus KERRATA.

Wings short, broad. *Forewing* triangular; costa almost straight, apex obtuse, exterior margin almost erect, even, posterior angle rounded, posterior margin straight; cell broad, extending more than half the length; second subcostal emitted immediately before end of the cell; discocellulars excurved, waved, radials from near upper end. Male, on upperside of the forewing with an inwardly oblique transverse discal dentiform glandular patch, disposed from the base of upper median to the submedian, above which it is interrupted, the patch exclusively clothed with very peculiar shaped jet-black scales, which are entirely different in shape from any present in this group of Satyrids, these black scales being moderately short, with the base attenuating to a point, a broad expanding tip having a lateral excurved point on each side, and in some of them also a central point. *Hindwing* with the exterior margin slightly scalloped and obtusely angular at end of the middle median; cell extending to more than half the length; middle median emitted before the end.

Middle and hind femora very hairy beneath. Antennæ short, with a lengthened well-formed thickened club.

Type.—K. tristigmata.

KERRATA TRISTIGMATA (Plate 89, figs. 2, 2a, b, c, ♂ ♀).

Lethe tristigmata, Elwes, Proc. Zool. Soc. Lond. 1887, p. 444; *id.* Trans. Ent. Soc. Lond. 1888, p. 318, pl. 8, fig. 1, ♂. De Nicéville, Journ. Bombay Nat. Hist. Soc. 1889, p. 163, pl. A. fig. 4, ♀.

IMAGO.—Male. Upperside olive-brown; glossy; cilia dusky cinereous. *Forewing* with two dusky-brown bars across middle of the cell; a transverse discal sinuous dusky-brown narrow band, which is dilated towards the costa and is faintly pale-bordered on its outer edge; a series of four minute pale olivescient-ochreous superposed subapical spots, and a submarginal darker brown shade. From the base of the upper median to the submedian vein, extends an inwardly *oblique dentiform glandular patch*, which is entirely clothed with *jet-black scales*; these scales, as seen under the microscope, are moderately short, with the base attenuating to a point, a broad expanding tip having a lateral excurved point on each side, and in some of them also a central point. *Hindwing* with a narrow discal sinuous dusky line, a subapical series of five blackish spots, a slender marginal line inwardly bordered by a pale line and outwardly by ochreous-brown; a submarginal dusky lunular shade.

Underside pale olivescient-ochreous. *Forewing* with the discal area somewhat cinerescent; cell streaks, sinuous discal band, the former with pale interspace, dark ochreous-brown; subapical spots distinct and pure white; marginal line with a slender pale inner-border. *Hindwing* with two subbasal and a discal sinuous dark ochreous-brown narrow band, the two former outwardly and the latter inwardly bordered by a narrow pale ochreous line; a series of five equal-sized ocelli, the fifth duplex, each with a small black centre and white pupil, an ochreous ring, a brown ring, and then an outer lilacine ring, the last being obsolescent on the two lowest ocelli; marginal line outwardly-bordered by ochreous and inwardly by a slender lilacine-white line ending in a triangular anal spot.

Female. Upperside somewhat paler. *Forewing* with the cell streaks, the sinuous discal anteriorly-dilated narrow band more sharply defined and blackish; the submarginal shade darker, subapical superposed-spots being five in number, larger, and more strongly defined. *Hindwing* with the discal sinuous line somewhat more distinct, the black spots larger, more prominent and each with a pale outer ring; marginal lines and the submarginal shade brighter coloured. Underside of a much brighter ochreous tint than in male. *Forewing* with the cell streaks and the upper discal area to the sinuous line darker and brighter ochreous-brown; the five subapical white spots as above; marginal line with a slender pale inner bordering

line. *Hindwing* with the two subbasal and the discal band darker and brighter ochreous-brown, their pale border less distinct; ocelli and lilacine-white inner marginal line and the ochreous outer line brighter and more prominent than in male. *Body* above clothed with glossy green and ochreous hairs; legs ochreous; palpi clothed with blackish hairs and its sides streaked with white; collar white; antennæ black above, ringed with white, reddish-ochreous beneath and at the tip.

Expanse, ♂ $2\frac{2}{3}$, ♀ $2\frac{4}{5}$ inches.

HABITAT.—Sikkim.

DISTRIBUTION.—Mr. H. J. Elwes remarks (Tr. Ent. Soc. 1888, 318), "Mr. Möller and myself both procured this species in Sikkim in 1886. I found the males only in July, on the Singalelah Range from about 9000 to 10,000 feet elevation, in open spots in the dense bamboo thicket. Many of them were then worn, and Möller's native collectors found it fresh in June. The insect is not so gregarious in its habits as some of the other *Lethes* found with it. We made numerous attempts to find the female at different seasons in the same spots where the males were taken, but did not discover it." According to Mr. L. de Nicéville (Journ. Bomb. N. H. S. 1889, 163) "a single female in Mr. Otto Möller's collection was obtained at Kala Pookri, 10,000 feet, in Native Sikkim on 19th July, 1888."

Our illustrations of this species on Plate No. 89, figs. 2, 2a, b, c, represent the male and female from specimens kindly lent for this purpose by Mr. H. J. Elwes and also by Mr. L. de Nicéville.

CHINESE ALLIED SPECIES OF KERRATA.—*K. nigrifascia* (Lethe *nigrifascia*, Leech, Entomologist, 1890, p. 28). *Habitat*, W. China.—*K. ocellata* (Debis *ocellata* Poujade, Bull. Soc. Ent. Fr. 1885, p. x.); *Syn.* *Lethe simulans*, Leech, l. c. 1891, p. 23. *Habitat*, E. Tibet; W. China.

Genus PUTLIA.

Charma,* Doherty, Journ. Asiatic Soc. Bengal, 1886, p. 117.

IMAGO.—*Forewing* short, triangular; costa very slightly arched, apex obtusely rounded, outer margin straight, even, posterior angle rounded; costal and median vein slightly swollen at the base; cell less than half length of the wing, broad at the end; first and second subcostal branches emitted before end of the cell; discocellulars outwardly oblique, long, slightly incurved; radials from near upper end, upper radial close to subcostal; upper median curving upward from the base. *Hindwing* rather elongated and narrow posteriorly; anterior margin convex, exterior margin scalloped and with a prolonged angle at end of upper and lower median veinlets; cell broad; first subcostal emitted at fully one-third before end of the cell; disco-

* Preoccupied through *Charmus*, for a genus of Arachnidæ, in 1879.

cellular long, outwardly oblique, radial from above its middle; two upper medians emitted from extreme end of the cell, lower median at one-fifth before the end; submedian straight; inner vein recurved; a *glandular patch** situated between the costal and subcostal vein, and extending into the cell and just within the fork of the subcostal veinlets, clothed with rather short narrow tapering *black scales*, which have either an obtuse pointed tip, or bidentate or tridentate tips. Thorax clothed with long silky hairs; palpi clothed with long fine hairs in front, apical joint short; legs rather stout, femora hairy beneath; antennæ slender and with a well-formed flattened club; eyes hairy. According to Mr. Doherty, "the prehensores are of extraordinary structure; the uncus (which is provided with rather short and slender branches) being cleft into two strong lobes lying in the same vertical longitudinal plane, and resembling the open claw of a lobster, the lower point being slightly the longer; a structure unknown among all other treta-pod butterflies."

Type.—P. Baladeva.

PUTLIA BALADEVA (Plate 90, fig. 1, 1a, ♂ ♀).

Zophoessa Baladeva, Moore, Proc. Zool. Soc. 1865, p. 769, pl. 41, fig. 5, ♂. Butler, Catal. Satyr.

Brit. Mus. p. 109 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 167 (1883).

Staudinger, Exot. Schmett. p. 221, pl. 78 (1887).

Charma Baladeva, Doherty, Journ. Asiatic Soc. Beng. 1886, p. 117.

Male and Female. Upperside olivescient ochreous-brown. Cilia edged with ochreous-white. *Forewing* crossed by an outwardly-oblique pale brownish discal fascia, terminating a little beyond the lower median veinlet, followed by a linear row of five small slightly pale-ringed blackish spots, all being encompassed by a lateral pale bordering slender fascia, beyond which is a narrow submarginal pale similar lunular fascia, and then a slender marginal line. *Hindwing* with a *glandular patch* situated between the costal and subcostal vein, clothed with rather short, narrow, tapering *black scales*, with either an obtuse tip, or bidentate or tridentate tips; an outer series of six black spots, the lowest being minute, each with an ochreous outer ring, and the lower fifth also with a minute white pupil; marginal brown line pale-bordered. Underside bright olivescient brownish-ochreous. *Forewing* with three pale-yellow bars across the cell, the middle one sharply defined; crossed by a broad pale-yellow oblique discal fascia, followed by a linear row of six ocelli, each with a very small black centre and white pupil, a broad ochreous ring, then a slender brown ring, and all encompassed by a narrow inward silvery-white band, and a slender outward yellow line; beyond is a pale-yellow lunular fascia, and then a slender marginal line. *Hindwing* crossed by a short outwardly-oblique subbasal pale-yellow narrow straight band, a broader straight medial discal band which is silvery-white

* This glandular patch is not present in *P. Ramadeva*, nor in *P. Andersoni*.

from the costa to lower end of the cell, and from thence to end yellow; beyond is a slender undulated pale-yellow discal band, an outer series of six prominent ocelli, the upper one being the largest and inwardly situated, each with a small black centre with white pupil, a bright ochreous broad ring, and a slender black ring, all being inwardly bordered by a silvery-white line and outwardly by a yellow line; marginal black line bordered by pale-yellow; the lower median and submedian vein also lined with yellow. *Body* and legs beneath, collar, and sides of palpi pale-ochreous; antennæ brown above, with blackish subterminal band and reddish tip.

Expanse, $2\frac{1}{2}$ to $2\frac{4}{5}$ inches.

HABITAT.—N.-W. and E. Himalayas.

DISTRIBUTION.—In Sikkim, Mr. H. J. Elwes "found this species rare on the road up to Tonglo, in July; a specimen was also taken on the Goompahar in June, and a few others on Tonglo and Tendong in August. It occurs at from 7000 to 9000 feet, and has the same habits as the *Zophoessas*. My collectors also brought it from the interior in 1881 and 1883. The female, which is rare, only differs from the male in being larger and paler" (Trans. Ent. Soc. 1888, 320). Mr. L. de Nicéville (Proc. As. Soc. Beng. 1887, 147) also records "its capture in Sikkim in September." Mr. W. Doherty (Journ. As. Soc. Bengal, 1886, 117) records the capture of specimens, which he refers to this species, in the Pindari Valley, at 7000 to 8000 feet elevation in N.-W. Kumaon, "these specimens being darker than those from Sikkim, and the silver band narrower." A specimen, taken in Kumaon, at 9000 feet, in June, is also in the British Museum collection.

PUTLIA RAMADEVA (Plate 90, figs. 3, 3a, ♂ ♀).

Zophoessa Ramadeva, de Nicéville, Proc. Asiatic Soc. Bengal, 1887, p. 147; *id.* Journ. Asiatic Soc. Beng. 1888, p. 274, pl. 13, fig. 3, ♂. Elwes, Trans. Ent. Soc. Lond. 1888, p. 320, pl. ix. fig. 2.

IMAGO.—Upperside olivescient ochreous-brown. Differs from *Baladeva* in the *forewing* being crossed by a broader oblique discal pale-brown band, an outer row of larger blackish spots encompassed by a broader pale lateral band, and followed only by a slender marginal line. *Hindwing* with similarly-disposed larger but less pale ringed spots. Underside much darker olive-brown. *Forewing* with only the middle pale olivescient-yellow bar across the cell, a discal band of the same width, followed by the silvery-white inner-bordered row of six darker and more prominent ocelli, and outer yellow lines. *Hindwing* crossed by a medial band which is silvery-white anteriorly and olive-yellow posteriorly, followed by the series of prominent ocelli, each with larger black centre, a white pupil, narrow ochreous ring, and then a dark-brown ring, all inwardly-bordered by dull silvery-white and outwardly the upper four ocelli by olivescient-yellow; the extreme outer margin of the wing being also yellow and traversed by the two dark brown marginal lines. *Body* and legs beneath, collar, and

sides of palpi pale olivescens-yellow; antennæ brown above, with dark subterminal band and reddish tip.

Expanse, $2\frac{2}{3}$ inches.

HABITAT.—Sikkim.

DISTRIBUTION.—Mr. L. de Nicéville (Proc. As. Soc. Beng. 1887, 147) records "a single male taken by Mr. O. Möller's native collectors in August, 1886, in the interior of Sikkim." Two specimens from Mr. Möller's collection, taken in July and August, are also in Mr. J. H. Leech's possession. Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 320) records "a single male, taken, either by himself or one of his collectors, on Tonglo, in July, 1886."

PUTLIA ANDERSONI (Plate 90, figs. 2, 2a, ♂).

Zophoessa Andersoni, Atkinson, Proc. Zool. Soc. 1871, p. 215, pl. 12, fig. 3; *id.* Anderson's Zool.

Researches Yunan Exp., i. p. 922, pl. 81, fig. 3 (1878) ♂. Marshall and de Nicéville, Butt. of India, etc., 1, p. 168 (1883).

Debis Andersoni, Oberthür, Etudes Ent. 1890, p. 41, pl. x, fig. 109, ♂.

IMAGO.—Male. Upperside olivaceous ochreous-brown; cilia ochreous-white. *Forewing* crossed by an outwardly-oblique pale brownish-ochreous narrow discal fascia terminating at the lower median veinlet, and a submarginal series of five pale brownish-ochreous spots, each with white pupil, followed by a slender pale marginal line. *Hindwing* with a series of four pale-bordered black spots, and a pale-bordered slender marginal line. Underside bright ochreous. *Forewing* with three transverse silvery-white bands, the outer one with an exterior contiguous slender pale-ochreous lunular line, followed by a slender pale-ochreous marginal line. *Hindwing* with a transverse median and an outer discal silvery-white band; bordering the latter is a series of six ocelli, each composed of a small black spot with white pupil, a broad bright ochreous ring, a slender blackish ring, and outwardly bordered by a narrow pale ochreous-yellow interrupted line, the upper and lower ocellus being entirely bordered by the silvery-white; marginal line pale ochreous-yellow; abdominal margin also edged with white. *Body* beneath pale brownish-ochreous; legs ochreous, femora white beneath; collar and sides of palpi white; antennæ dusky-brown above annulated with white, subterminal band black, tip ochreous-red.

Expanse, $2\frac{2}{3}$ to $2\frac{4}{5}$ inches.

HABITAT.—Eastern Burma; Yunan.

DISTRIBUTION.—There were two specimens of the male of this rare butterfly in the late Mr. W. S. Atkinson's collection, labelled Bhamo, Yunan, taken by Dr. J. Auderson. These are now in the Hewitsonian collection at the British Museum. "There are also two males in the Indian Museum, Calcutta, one being from Ponsee, where

it was taken by Dr. Anderson during the Yunan Expedition in March, 1868, the other being without locality" (Butt. Ind. i. 168).

CHINESE ALLIED SPECIES OF PUTLIA.—*P. albolineata* (Debis albolineata, Poujade, Bull. Ent. Soc. France, 1885, p. 143, Oberthür, Etudes Ent. p. 41, pl. x. fig. 111). *Habitat*, E. Tibet.—*P. luteofasciata* (Debis luteofasciata, Poujade, l. c. p. 144, Oberthür, l. c. p. 41, pl. x. fig. 108). *Habitat*, E. Tibet.—*P. argentata* (Zophoessa argentata, Leech, Entomologist, 1891, p. 1). *Habitat*, W. China.

Genus ZOPHOESSA.

Zophoessa, Doubleday and Hewitson, Gen. Diurnal Lep. pl. 61, fig. 1 (1849); Westwood, *id.* p. 362 (1851). Butler, Ent. Mo. Mag. 1868, p. 195; Catal. Satyr. Brit. Mus. p. 108 (1868). Scudder, Amer. Soc. Arts and Sci. Boston (1875), p. 292. Marshall and de Nicéville, Butt. of India, etc. i. p. 162 (1883).

IMAGO.—Male. *Forewing* short, broad, triangular; costa very slightly arched, apex obtuse, exterior margin very slightly scalloped. Upperside not hairy; with a very broad transverse discal *glandular fascia*, clothed with short more or less broad basally-tapering scales, having either two, three, or four-toothed tips, and with numerous interspersed very narrow shorter androconia having three very short fine straight hair-like tips and truncate base; costal vein slightly swollen; cell long, extending beyond half the wing, moderately broad; two first subcostal branches emitted before end of the cell; discocellulars excurved, outwardly oblique, radials from near upper end; median veinlets widely separated. *Hindwing* short, broad, exterior margin scalloped and with a prolonged angle at end of upper median veinlet and a shorter more obtuse angle at end of the lower median; cell broad; first subcostal branch emitted at nearly one-fourth before end of cell; discocellulars long, outwardly oblique, angular in the middle, radial from the angle; two upper medians from extreme end of the cell. *Thorax* finely hairy; palpi long, slender, elevated, hairy in front, apical joint slender; femora finely hairy beneath; antennæ long, slender, with an elongated cylindrical club; eyes hairy.

Type.—Z. Sura.

ZOPHOESSA SURA (Plate 91, figs. 1, 1a, ♂ ♀.)

Zophoessa Sura, Doubleday and Hewitson, Gen. D. Lep. pl. 61, fig. 1 (1849); Westwood, *id.* p. 362 (1851). Butler, Ent. Mo. Mag. 1868, p. 195; Catal. Satyr. Brit. Mus. p. 108 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 162 (1883).

IMAGO.—Male. Upperside dark olivaceous ochreous-brown, somewhat ænescent and glossy in certain lights; cilia alternately brown and white. *Forewing* with an indistinctly defined transverse discal broad dusky-brown sinuous-edged *glandular fascia*, which is clothed with short more or less broad basally-tapering scales, having either two, three, or four-toothed tips, and with numerous interspersed very narrow

shorter androconia having three very short fine straight hair-like tips and truncate base; beyond is a narrow submarginal dusky-brown lunular ordinary fascia, and before the apex are two small indistinct pale brownish-ochreous costal spots. *Hindwing* with an ill-defined transverse discal angular dusky-brown fascia, and a submarginal lunular fascia, their intermediate area being paler ochreous-brown, and bearing five round blackish slightly pale-ringed spots; marginal line slender and bordered by pale brownish-ochreous. Underside pale olivescient ochreous-brown, glossy. *Forewing* with two broad darker-brown bands crossing the cell, with a broad intervening and a narrow outer glossy purplish-white band; a posteriorly decreasing transverse discal dark-brown band with outer purplish-white border; beyond which are three, sometimes four, small superposed pale ocelli, and above them a costal whitish intersected spot, followed by a brown submarginal fascia and a slender marginal line. *Hindwing* crossed by three subbasal and a discal interrupted zigzag glossy purplish-white line, the third subbasal line narrowly inwardly-bordered by a dark-brown, and the discal line broadly outwardly-bordered by a dark-brown angular fascia; beyond which is a series of six prominent ocelli, the sixth being duplex, each with a black centre and white pupil, and the upper four also blue-speckled, an ochreous ring, a broader brown ring, and then an outer glossy purplish-white ring; outer marginal border dark-brown, traversed by a prominent slender glossy purplish-white marginal line, which is dilated before the anal angle.

Female. Upperside paler. *Forewing* darkest basally; with a broad transverse dusky-black discal fascia, having a sharply-defined, wavy, sinuous outer edge; the outer third of the wing being pale ochreous-brown, and traversed by a darker submarginal narrow fascia; subapical costal spots as in male. *Hindwing* as in male, with the spots placed on a pale ochreous-brown ground. Underside much more ochreous in tint, paler than in male; markings the same, except that on the forewing the cell bands are outwardly-bordered with pale-ochreous, the transverse fascia broader and paler, and the basal markings on the hindwing are pale-ochreous bordered, instead of by purplish-white. *Thorax* clothed with glossy iridescent and reddish hairs; abdomen beneath, and legs pale brownish-ochreous, femora and tibiae beneath whitish; collar and sides of palpi white; antennae brown above, annulated with white, with a long slender black subterminal club, tip reddish.

Expanse, ♂ $2\frac{6}{8}$ to $3\frac{2}{8}$, ♀ $3\frac{2}{8}$ to $3\frac{4}{8}$ inches.

HABITAT.—Sikkim; Khasia Hills; Upper Burma.

DISTRIBUTION AND HABITS.—“Not uncommon in Sikkim in the forest from about 8000 feet, from the end of June on until November. The males are seen singly, or in company with other Satyrinae, sitting on the path or low herbage, and if disturbed generally fly up and settle on the trunk of a tree, where they are difficult to distinguish among the dark moss. I took males in June and July on Sinchul; females are rarer, and fly but little, though sometimes taken

on the bare top of the hill at Sinchul and Jellapahar. I found it also in the Khasia Hills, near Cherra Punji, at 4000 feet, in the end of September" (Elwes, Trans. Ent. Soc. 1888, 318). Mr. Otto Möller took males near Darjiling, at 6000 feet, in November (Butt. Ind. i. 165). A female, taken also by Mr. Möller in Sikkim, at 7000 feet, at end of October, is in Mr. J. H. Leech's collection. Specimens were in the late Mr. W. S. Atkinson's collection from Darjiling and the Khasia Hills. Mr. Elwes (P. Z. S. 1891, 264) also records it as having been taken by Mr. W. Doherty as "common near Bernardmyo, at 6000 feet, in Upper Burma."

ZOPHOESSA DURA (Plate 91, fig. 2, ♂).

Zophoessa Dura, Marshall, Journ. Asiatic Soc. Beng. 1882, p. 38, pl. 4, fig. 2, ♂. Marshall and de Nicéville, Butt. of India, etc. i. p. 165 (1883).

IMAGO.—Male. Upperside dark velvet-brown, with a faint purplish gloss, and in some lights a golden sheen; the outer margins being abruptly paler, the pale margin widening on the hindwing where it occupies nearly half the wing. Cilia alternated with white. *Forewing* crossed by a very broad discal indistinct dusky *glandular fascia* and a brown submarginal line; a small very indistinct ochreous intersected spot on the costa before the apex. *Hindwing* with an outer series of four small round blackish spots on the pale outer border, followed by a submarginal dusky lunular line, and pale ochreous-bordered marginal lines. Underside paler. *Forewing* with an excurved glossy silvery-grey brown-bordered band within the cell, a wavy excurved brown transverse discal fascia, with glossy silvery-grey border at its outer costal end; followed by three small silvery-grey subapical ocelli and an upper costal prominent intersected spot, beyond which is a narrow brown lunular submarginal line and a very slender marginal line. *Hindwing* crossed by three subbasal and a discal glossy silvery-grey zigzag line, with the inner and outer brown border, as in *Z. Sura*, followed by a series of similar ocelli, but which have paler-ochreous rings and the outer encompassing silvery-grey ring broader externally; marginal lines narrower. *Abdomen* and legs beneath pale ochreous-grey; collar and sides of palpi white; antennæ blackish above, annulated with white, and with a long slender black club, tip reddish-ochreous.

Expanse, 2 $\frac{6}{8}$ inches.

HABITAT.—Upper Tenasserim.

DISTRIBUTION.—The type specimen described and figured by Col. Marshall was taken by Capt. C. T. Bingham "in the lower Thoungyeen forests, Upper Tenasserim, in May" (Butt. Ind. i. 165).

The illustration of this species on Plate 91, fig. 2, is a reproduction of Col. Marshall's figure above referred to.

ZOPHOESSA GAMMIEI (Plate 91, fig. 3, ♂).

Zophoessa Dura, Elwes, Trans. Ent. Soc. 1888, p. 319, pl. ix, fig. 1, ♂.

IMAGO.—Male. Upperside paler than in typical *Z. Dura*. *Forewing* with the outer border distinctly paler, and the costal spot distinct. *Hindwing* also with the outer border distinctly paler, being of a glossy cinerous tint, and divided from the dark basal area by a distinct recurved edge; the lunular submarginal line, and marginal lines prominent; the series of small blackish spots are five in number.

Underside also paler than in *Z. Dura*; similarly marked, except that, on the forewing, the three subapical spots are ocellated, each having a blackish centre, a white pupil, and a silvery-grey outer-ring; on the hindwing, the dark outer border to the discal silvery-grey zigzag line is much broader; the five upper ocelli also being almost entirely blue-speckled in their centre.

Expanse, $2\frac{1}{2}$ inches.

HABITAT.—Bhotan.

DISTRIBUTION.—According to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 319) "two males were procured by Mr. Gammie's Native collectors somewhere East of the Tista River, in Bhotan, in 1884 and 1885." Mr. O. Möller also obtained males in Bhotan in September, 1888.

Our illustration of this species on Plate 91, fig. 3, represents a male, taken by Mr. O. Möller in Bhotan, kindly lent for this purpose by Mr. J. H. Leech.

ZOPHOESSA GOALPARA (Plate 91, figs. 4, 4a, ♂).

Zophoessa Goalpara, Moore, Proc. Zool. Soc. 1865, p. 768, Butler, Catal. Satyr. Brit. Mus. p. 109 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 165 (1883). Staudinger, Exot. Schmett, p. 221, pl. 78 (1887).

IMAGO.—Male. Upperside dark olivaceous ochreous-brown, with an æscent gloss; cilia slightly alternated with white. *Forewing* crossed by a posteriorly-broad discal dusky-brown *glandular fascia*, with a black sinuous exterior edge, and clothed with exactly the same kind and shaped scales as in *Z. Sura*, the fascia being exteriorly bordered at its costal end by pale brownish-ochreous; two short dusky-brown bars across the cell, and a dusky-brown submarginal lunular fascia, and a pale brownish-ochreous spot on the costa before the apex. *Hindwing* crossed by a dusky-black narrow angulated discal band, a series of five round black spots, a submarginal lunular fascia, and a slender marginal line, the latter being dark ochreous-bordered. Underside very pale olivaceous brownish-ochreous. *Forewing* crossed by two dark ochreous-brown medial bands within the cell, and another bordering the discocellulars, a prominent discal fascia with sharply-defined sinuous exterior edge and pale-yellow bordering at its costal end, followed by one (generally two) small subapical pale ocelli, above which is an intersected whitish costal spot, and beyond a submarginal

brown fascia and slender marginal line. *Hindwing* crossed by a dark ochreous-brown basal angulated band, a subbasal sinuous line, and a sharply-defined sinuous discal fascia, the former outwardly and the latter inwardly pale-bordered; a series of six prominent ocelli, the sixth being duplex, each with a black centre, white pupil and also bluish speckles, a narrow ochreous ring, a broad brownish ring, and then a narrow pinkish-white outer ring; marginal line inwardly-bordered by a pinkish-white line, which is broadly lunular from the median angle, and outwardly by reddish-ochreous; the area bordering the ocelli pale ochreous-brown. *Body* beneath and legs brownish-ochreous; femora beneath whitish; palpi darker-brown, sides white; collar white; antennæ dark-brown above, with a short broad stout black club.

Expanse, $2\frac{3}{4}$ to 3 inches.

HABITAT.—N.-W. and E. Himalayas; Assam.

DISTRIBUTION.—“Though apparently very local, this species has a wide range. The Indian Museum, Calcutta, possesses specimens from Sibsager in Upper Assam; in the neighbourhood of Darjiling, in Sikkim, it is found but rarely; and in the neighbourhood of Simla, it is not uncommon in some years at Sidhpur and in the Narkunda forests, at about 9000 feet elevation, at the end of July and beginning of August, but there is no record as yet of its occurrence in the vast intermediate area. The specimens from Simla differ from those from Sikkim in having, on the upper-side, the spots on the hindwing smaller, and on the underside in that the yellowish basal area of the hindwing is much more suffused with brown, especially towards the abdominal margin, the pure yellowish tone being confined to the space between the subbasal and discal brown bands above the median vein, and to narrow diffused edgings to all the brown bands. This suffusion with brown is apparent even in Sikkim specimens, but in them it is far less pronounced and less extended” (Butt. Ind. i. 166). Mr. W. Doherty (Journ. A. S. Beng. 1886, 117) records the capture of specimens in Kumaon, at Dhankuri, and at Khati, from 7000 to 9000 feet elevation.” Mr. H. J. Elwes says (Tr. Ent. Soc. 1888, 319), “I have not taken this species myself in Sikkim, but Mr. O. Möller took it at 6000 feet in November, and it seems to be commoner than *Z. Sura* in the forest at 6000 to 8000 feet in British Bhotan, where I took it in August near Rikisum. My Shikaris brought it from Tendong and from Bhotan, and it occurs as far North-West as Simla. I have not seen the female.”

ZOPHOESSA ATKINSONIA (Plate 92, figs. 1, 1a, ♂).

Zophoessa atkinsonia, Hewitson, Entom. Monthly Mag. 1876, p. 151, ♂; Moore, Desc. Lep. Coll. Atkinson, p. 2, pl. 1, figs. 2, 3 (1879); Proc. Zool. Soc. 1882, p. 406. Marshall and de Nicéville, Butt. of India, etc. i. p. 166.

IMAGO.—Male. Upside olivescient ochreous-brown, darkest exteriorly; cilia

pale-ochreous. *Forewing* crossed by two blackish bars within the cell, with their interspace ochreous; an inner discal interrupted *glandular fascia*, which is clothed with numerous rather short narrow blackish-brown scales, having slightly divergent bidentate tips, and a few larger wide paler ribbed-scales with tridentate tips; beyond which is an outer discal blackish angulated band, outwardly bordered by an ochreous macular band, followed by a subapical superposed row of small ochreous spots, and a submarginal blackish lunular fascia. *Hindwing* crossed by a narrow angulated blackish discal band and a submarginal lunular band, their interspace being ochreous and bearing five rounded black spots, each of which has a slightly paler outer ring, the two upper spots being the largest and the third the smallest. Underside paler olivescient brownish-ochreous (as in *Z. Goalpara*). *Forewing* crossed by two broad dark olivescient-brown bars within the cell, with pale olivescient-ochreous interspaces; followed by a dark discal angulated pale-ochreous outer bordered band, two superposed small white subapical spots, and an upper white intersected costal spot; beyond which is a dark narrow submarginal fascia, and a slender marginal line. *Hindwing* crossed by a subbasal wavy dark-brown band with white border, a narrow bidentate medial streak, and a broad angulated discal band, their inner areas being pale-ochreous; followed by a series of five ocelli (the usual anal ocellus being absent), each with a black centre and blue-speckled pupil, a narrow ochreous ring, and then a narrow brown ring, the upper ocelli being further bordered exteriorly with white; marginal line with a slender nacreous-white inner border, which is triangularly dilated at the anal angle. *Body* beneath, fore legs, middle and hind legs beneath, and sides of palpi pale-ochreous; collar white; antennæ brown above, reddish-ochreous beneath, with a well-formed club having a subterminal black band.

Expanse, $2\frac{1}{3}$ to $2\frac{2}{3}$ inches.

HABITAT.—Sikkim; Bhotan.

DISTRIBUTION.—“Taken at Senchal, in Sikkim, at 8000 feet, in August, by Mr. Paul Mowis” (J. A. S. Beng. 1883, 93). Mr. H. J. Elwes writes (Tr. Ent. Soc. 1888, 319), “I found this species, which has hitherto been very rare in collections, not uncommon on the road to Tonglo, in Sikkim, at 8000 to 9000 feet, in July; and Mr. Möller’s collectors brought numerous specimens from the same locality in August. It also occurs in the interior of Bhotan and Sikkim. It settles on the path and flies into the forest when disturbed. The females are seldom taken, and differ but slightly from the male.”

ZOPHOESSA JALAUURIDA (Plate 92, figs. 2, 2a, ♂).

Zophoessa Jalaurida, de Nicéville, Journ. Asiatic Soc. Bengal, 1880, p. 245. Marshall and de Nicéville, Butt. of India, etc. i. p. 166, pl. x. fig. 19, ♂.

IMAGO.—Male. Upperside dusky olive-brown, glossy; cilia prominently alter-

nated with ochreous-white. *Forewing* crossed by an inner-discal *glandular fascia*, clothed with numerous short tapering black-scales, with tridentate tips, the outer points of which are divergent, and a few interspersed larger broad ribbed-scales, with tridentate or quadridentate tips; two blackish bars within the cell, their interspace being pale olivescient-ochreous; an outer-discal black sinuous band terminating outwardly on the posterior margin, and with a pale olivescient-ochreous macular outer border, followed by four superposed subapical minute pale-ochreous spots, and an upper costal intersected spot, and beyond by a blackish submarginal fascia. *Hindwing* crossed by an indistinct blackish short medial band, which is divided in crossing the cell, an angular discal band, a series of five prominent (and a sixth obsolescent) black round spots with slight pale outer ring, followed by a lunular submarginal fascia and a slender marginal line. Underside paler olive-brown. *Forewing* with the bands and spots as above, but much more distinctly defined, and the pale bordering yellower, the subapical spots more prominent and ocellate—being black with a lilacine-white speckled pupil, and all inwardly bordered by a whitish fascia; submarginal fascia followed by a slender marginal line. *Hindwing* crossed by two silvery-white slender wavy subbasal lines and a discal line, the latter being broad at its costal end and tapering to the upper median veinlet, where it is also brown-speckled and has a contiguous short streak within the cell, and from thence it extends slenderly and sinuous to its end, each line being also bent inward posteriorly and joins a silvery-white line along the abdominal border; a silvery-white streak also extending along the lower median veinlet from its base to the discal line; the subbasal line, the upper inner-portion and the entire outer-edge of the discal line, bordered with darker olive-brown; beyond is a series of six prominent ocelli, the sixth being duplex, each with a black centre and blue-speckled pupil, ochreous ring, a brown ring, and all encompassed by a narrow indistinct lilacine-white outer line, which is dilated exteriorly towards the apex; beyond is a slender black marginal line, inwardly bordered by a silvery-white line—which is dilated at the anal end, and outwardly by ochreous. *Abdomen* and legs beneath pale olivescient-ochreous; legs above brown; palpi black edged and with white lateral streak; collar white.

Female. Differs from the male only in its larger size, broader wings, and somewhat paler markings.

Expanse, $2\frac{1}{8}$ to $2\frac{3}{8}$ inches.

HABITAT.—N.-W. Himalayas.

DISTRIBUTION.—“Appears to be confined to the Western Himalayas. Mr. L. de Nicéville took a large number of this species near the top of the Jalaury Pass on July 29th, 1879; none were on the wing, but all were settled on the red flower of a *Persicaria*, which grows abundantly in the thick forest, between 6000 to 8000 feet, clothing the Kulu side of the Pass. Strangely enough, this flower was entirely dis-

regarded by all other butterflies (except the single *Lethe Maitrya* taken in the same place) flying about, and were taken settled on nothing else. This species is also not uncommon in the Narkunda and Bhagi forests in the neighbourhood of Simla, at about 8000 to 9000 feet elevation, at the end of July and the beginning of August. Col. A. M. Lang took several specimens there in 1865 and in 1882. Mr. W. Doherty found it commonly there at the same season" (Butt. Ind. i. 167). Mr. W. Doherty (J. A. S. Beng. 1886, 117) also records it from "Dhankuri, Khati, and Dwali, in North-West Kumaon, at from 7000 to 11,000 feet elevation."

ZOPHOESSA ELWESI (Plate 92, fig. 3, ♂).

Zophoessa Jalaurida, Elwes, Trans. Ent. Soc. 1888, p. 320, pl. 8, fig. 4, ♂. (*Nec de N.*)

Upperside similar to typical *Z. Jalaurida*. *Forewing* with the transverse discal pale macular band more irregular in its course. Underside differing in its general paler colour. *Forewing* conspicuously pale olivescient ochreous-brown basally, with prominently defined dark-brown cell bands and sinuous discal band. *Hindwing* paler olivescient-brown, with distinctly sharper defined silvery-white lines, the upper portion of the discal band broader to its end beyond the cell, the anal ocellus being single, not duplex as in *Jalaurida*.

Expanse, 2 to $2\frac{1}{8}$ inches.

HABITAT.—E. Himalayas; Sikkim; Bhotan.

This is sufficiently different from its N.-W. Himalayan ally to be distinguished as a local form, the differences above noted being constant in a number of examples of both forms under examination.

DISTRIBUTION AND HABITS.—Mr. H. J. Elwes writes (Tr. Ent. Soc. 1888, 320), "I found this very abundant all along the Singalelah Range between Sikkim and Nepal, from 9000 to nearly 12,000 feet, in July and August. It is the most abundant butterfly here, and frequents the open places in the forest, flying quickly in dull and rainy weather, and settling on the paths, where several collect together at any ordure. It settles on bamboo, and also rocks, where many might be found on wet days and in the evening, and bottled like moths. I also found it on the top of the Rishilah, in British Bhotan, at 10,000 feet, and my shikaris brought it from Chumbi or Bhotan in 1884 and 1885. The female is comparatively scarce, and hardly differs from the male."

ZOPHOESSA MÖLLERI (Plate 92, figs. 4, 4a, ♂).

Zophoessa Mölleri, Elwes, Proc. Zool. Soc. 1887, p. 445; *id.* Trans. Ent. Soc. 1888, p. 321, pl. 8, fig. 3.

IMAGO.—Male and Female. Nearest allied to *Z. Elwesi*. Upperside differs on the *forewing* in the absence of the pale cell-bar, in the more acutely sinuous dusky discal

fascia terminating inwardly on the posterior margin, and its much less defined (almost obsolescent) macular outer border, as well as the much less distinct subapical spots. On the *hindwing*, the discal angular fascia is less defined and nearer the series of ocelli. Underside. *Forewing* with similar pale olivescient ground-colour, a broader pale interspace between the dark-brown cell bars, the discal sinuous band terminating inwardly on the posterior margin. *Hindwing* with two straight subbasal silvery-white bands, distinctly broader, but the inner one the least defined, the discal silvery-white band being much broader and of uniform width from the costa to the median vein, where it incloses the brown discocellular veinlet; ocelli with a less blue-speckled pupil, and the anal ocellus duplex.

Expanse, 2 to 2½ inches.

HABITAT.—E. Himalayas; Sikkim.

DISTRIBUTION.—Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 321) writes, "I found this species, in Sikkim, on the Singalelah Range from 9000 to 10,000 feet, in July, 1886, mixed with the preceding species [Elwesi], but not nearly so abundant. The females, of which I took one or two, are very rare. It has the same habits."

CHINESE ALLIED SPECIES OF ZOPHOESSA.—*Z. libitina*, Leech, Entomologist, 1891, p. 2. *Habitat*, W. China.—*Z. Helle* Leech, *id.* p. 1. *Habitat*, W. China.—*Z. procne*, Leech, *id.* p. 2. *Habitat*, W. China.—*Z. Armandina* (Debis Armandina Oberthür, Etud. Ent. 1881, p. 16, pl. 7, fig. 6). *Habitat*, E. Tibet.—*Z. gracilis* (Pargange gracilis, Oberthür, Etudes Ent. 1886, p. 23, pl. 4, fig. 19). *Habitat*, E. Tibet.

The following is an allied Japanese form. *Genus nov.* HARIMA.—Male. *Forewing* elongate, subtriangular; costa very slightly arched, apex obtusely rounded, exterior margin slightly convex; cell very long, radials near upper end of discocellulars; *no androconial patch*. *Hindwing* slightly elongate, broadly pyriform, exterior margin very convex, very slightly scalloped and angulate in the middle; cell long, discocellular very oblique; two upper median veinlets emitted from end of the cell. Palpi elongate, slender, clothed in front with very short hairs. Antennæ rather stout, with a gradually thickened club. TYPE.—*H. Callipteris* (Neope Callipteris Butler, Ann. Nat. Hist. S. 4, xix. p. 92. Pryer, Butt. of Japan, p. 32, pl. 10, fig. 2 (1889)). *Habitat*, Japan.

Genus BLANAIDA.

Enope,¹ Moore, Catal. Lep. Mus. E. I. Compy. i. p. 228 (1857).

Neope,² Moore, Proc. Zool. Soc. 1865, p. 770. Butler, Ann. Nat. Hist. 1867, p. 166. Marshall and de Nicéville, Butt. of India, etc. i. p. 169 (1883).

Blanaida, Kirby, Syn. Catal. D. Lep. Suppl. p. 699 (1877).

IMAGO.—Male. *Forewing* triangular, somewhat elongated, and narrow; costa

¹ Preoccupied in Lepidoptera, by Walker, 1854.

² Preoccupied through *Neopus*, in Aves, by Hodgson, 1844.

arched, apex rounded, exterior margin slightly scalloped. Upperside with a slightly perceptible broad transverse discal *glandular fascia*, clothed with long narrow dark scales with bidentate or tridentate tips, interspersed with very numerous slender long *androconia* with long bulbous base and fine hair-like tasselled tip, and also with a few fine long hairs; costal vein slightly swollen at the base; cell extending to more than half the wing; discocellulars outwardly oblique and slightly excurved, upper radial near the subcostal, lower radial from slight angle above the middle. *Hindwing* short, broad; exterior margin obliquely-convex, scalloped and with an obtuse broad angle at end of middle median veinlet, anal angle rounded; cell extending fully half the wing; discocellulars very oblique and angular in the middle, radial from the angle; middle median emitted at end of the cell. *Body* rather robust, thorax finely hairy; palpi rather short and stout, thickly hairy in front, apical joint long, cylindrical; legs stout, femora finely hairy beneath; antennæ rather stout, with a well-formed thickened club; eyes hairy.

Type.—B. Bhadra.

BLANAIDA BHADRA (Plate 93, figs. 1, 1a, b, ♂ ♀).

Lasiommatæ (*Enope*) *Bhadra*, Moore, Catal. Lep. Mus. E. I. Compy. i. p. 227 (1857).

Neope Bhadra, Moore, Proc. Zool. Soc. 1865, p. 770. Butler, Ann. Nat. Hist. 1867, p. 166; Catal.

Satyr. Brit. Mus. p. 112 (1868). Marshall and de Nicéville, Butt. of India, i. p. 171 (1883).

Staudinger, Exot. Schmett. p. 222, pl. 78, ♂ (1887).

IMAGO.—Male. Upperside dusky olivescient ochreous-brown, darkest exteriorly; cilia alternated with ochreous-white. *Forewing* crossed by a slightly-perceptible broad dusky discal *glandular fascia*, clothed with long narrow scales with bidentate or tridentate tips, and interspersed with very numerous slender *androconia* with long bulbous base and fine hair-like tasselled tip, of similar length, and also with a few fine long hairs; two prominent ochreous-white sinuous streaks within the cell, an elongated streak below the cell, and two outer discal transverse irregular series of spots, the posterior streak being more or less ochreous at its base. *Hindwing* with two outer curved series of dark ochreous-yellow conical spots, those between the median veinlets and also of the radial having an intervening blackish spot, the lowest spot always being round and encircled by a distinct ochreous ring, the other two being generally quadrate; the cell and abdominal border clouded with ochreous. Underside dark-brown. *Forewing* with the cell streaks, the posterior streak, and the outer series of spots, as on the upperside, but more irregularly defined and whiter; between the radials and also between the two upper medians is a black ocellate spot, each with an ochreous ring and then a more or less defined black ring, the upper spot being the smallest and more prominent; a third similar-ringed spot is also present between the lower radial and upper median, but is almost obliterated by the ordinary white spot; along

the costa and also before the apex are four white streaks, the intervening area between the latter and the ocellus being speckled with pinkish scales; marginal lines blackish, sinuous. *Hindwing* variegated with a short pinkish-white streak along base of the costa, then a broad broken irregular-bordered dark-brown band intersected by another irregular pinkish-white band, having a distinct brown spot within the cell, followed across the disc by a very irregular zigzag angulated dark-brown bordered band, having an elongated dash above the base of upper median veinlet; outside this is a series of eight prominent ocelli, the seventh being also duplex, each with a small black centre and white pupil, an ochreous ring and then an outer black ring; the eighth ocellus, small and more or less developed, being situated above the anal angle; marginal blackish slender line more or less ochreous-bordered; the area bordering the ocelli irrorated with pinkish-grey scales. *Body* brown; abdomen beneath pale-ochreous; streak on sides of palpi, collar, entire forelegs, middle and hind femora beneath ochreous-white; antennæ reddish.

Female somewhat larger. Upper and underside marked as in male.

Expanse $3\frac{3}{8}$ to $3\frac{7}{8}$ inches.

HABITAT.—Sikkim; Assam; Western Burma.

SEASONAL FORM (Plate 93, fig. 1, c, ♂). Somewhat smaller.—Upperside with similarly-disposed markings on both sexes. *Forewing* with the pale ochreous-white markings broader. *Hindwing* pale brownish-ochreous, with the anterior marginal border paler brown, and the brown markings more restricted. Underside of a paler ground-colour, the darker parts also more subdued. *Forewing* with similar but broader markings. *Hindwing* with similar basal and discal broken brown markings; the ocelli, however, are much less developed, being only about half the size, and much paler.

Expanse, ♂ $3\frac{2}{8}$, ♀ $3\frac{3}{8}$ inches.

Males of this form, from Sikkim, are in our own collection, and also in that of Mr. H. Grose-Smith. A female under examination was taken in Sikkim, in March, by Mr. O. Möller, and is in the collection of Mr. J. H. Leech.

DISTRIBUTION AND HABITS.—Mr. L. de Nicéville found this species in profusion in the Great Runjeet Valley, Sikkim, in October. "It settles on the road with closed wings, flying off into the jungle when disturbed. The beautifully variegated underside of this species effectually hides it when settled, as is its habit, amongst dead leaves. Mr. O. Möller has also taken it in the neighbourhood of Darjiling in May and June" (Butt. Ind. I. 171). A female, in the collection of Mr. J. H. Leech, was taken by Mr. Möller in Sikkim, in November. Mr. H. J. Elwes records this species as being "found in the hot valleys of Sikkim from 1 to 3 or 4000 feet, between May and December. I never saw it in profusion, but only solitary specimens. It settles on the ground as well as on tree-trunks, and if disturbed goes off

at once into the forest" (Tr. Ent. Soc. 1888, 321). Specimens were in the late Mr. W. S. Atkinson's collection from Darjiling and Cherra Punji. Major C. H. E. Adamson (Catal. of Burmese Butterflies, p. 8) records "a single specimen caught in bamboo forest, in April, 1883, at 3000 feet, in the Arrakan Hills." According to Mr. H. J. Elwes (P. Z. S. 1891, 265) "examples not differing from Sikkim and Khasia specimens, except that the markings of the hindwing are somewhat paler, were taken by Mr. W. Doherty in the Karen Hills at 4000 to 5000 feet elevation." We have examined specimens obtained by Signor Leonardo Fea at Cabopa in the Karen Hills, in October, and at Meteleo, in September.

BLANAIDA KHASIANA (Plate 93, fig. 2, ♂).

Neope Khasiana, Moore, Trans. Ent. Soc. Lond. 1881, p. 306. Marshall and de Nicéville, Butt. of India, etc. i. p. 172 (1883).

IMAGO.—Male. Upperside. *Forewing* with similar markings to those in *B. Bhadra*; the two streaks within the cell much less distinct, the one crossing the middle almost obsolete; the streak between the lower median and submedian confluent with its terminal spot. *Hindwing* ochreous-yellow, with the costal border and apical end of the exterior border brown, the immediate base of the wing ochreous-brown; a large oval dark-brown spot beyond lower end of the cell, and a discal curved series of six round spots decreasing in size to a minute spot above anal angle. Underside similarly marked to *B. Bhadra*, except that on the forewing there are two subapical ocelli, the lower one situated between the upper and middle median veinlets, the three streaks crossing the cell are angled outward in the middle, and the posterior margin is broadly ochreous. *Hindwing* with a regular transverse sub-basal ochreous-white fascia, the dark spot beyond end of the cell smaller and more prominent, the series of ocelli also smaller, their interspace on both sides paler ochreous-brown.

Expanse, $3\frac{2}{8}$ inches.

HABITAT.—Khasia Hills; Naga Hills; Eastern Burma.

This is nearest allied to *B. Armandii*, Oberthür, Etudes Entom. 1876, p. 27, pl. 2, fig. 5, from Moupin, E. Tibet, specimens of which have been compared in the collections of Mr. J. H. Leech and Mr. H. Grose-Smith.

From the *seasonal form* of *Bhadra*, above described, and figured, *Khasiana* differs, on the upperside, in the markings of the forewing being smaller and posteriorly ochreous in colour, the basal cell streak being obsolete; and, on the hindwing, by the brighter ochreous-yellow colour, smaller brown mark beyond the cell, and in the more developed series of ocelli. On the underside, the pale ground colour is bright ochreous. In the forewing the pale cell streaks are very narrow, angular, and the middle one differently positioned, the edge of the upper discal dark-brown patch

more convex and less sinuous, and there are two prominent ocelli present. In the *hindwing*, the broken subbasal and discal brown portions are somewhat different; the ocelli being also more prominently developed.

DISTRIBUTION.—Two males of this species, from the Khasias, are in our own collection. Mr. H. J. Elwes (P. Z. S. 1891, 265) records under the name of *Neope armandii*, "two males captured by Mr. W. Doherty, in the Naga Hills, and one from Bernardmyo, in the Shan States, Burma." The male here referred to from Bernardmyo, which Mr. Elwes has kindly lent us, is identical with the male type of *Khasiana*. A female, also sent with it, from the Naga Hills, two inches and six-eighths in expanse, has the upperside of the forewing similar to the male, but the hindwing is dark olivescence-brown throughout, with yellow markings only upon the outer border of the cell, and the submarginal series of ringed and dentate spots, similar to those in *B. Pulahoides*. The underside is also darker coloured, the markings more compact than in the male. Those on the forewing similar to the male. On the hindwing the basal and lower discal dark portions are also similar but somewhat broader and darker, the intervening subbasal division being narrower, and the entire outer area of the wing is also darker coloured, being of an olivescence-brown tint, not ochreous as in the male; the ocelli are like those of the male but a little darker.

The illustration of this species on our Plate 93, fig. 2, represents the male type in our own collection.

BLANAIDA PULAHA (Plate 94, fig. 1, ♂).

Lasiommata (Enope) Pulaha, Moore, Catal. Lep. Mus. E. I. Comp. i. p. 227 (1857).

Enope Pulaha, Moore, Proc. Zool. Soc. 1865, p. 499.

Neope Pulaha, Moore, Proc. Zool. Soc. 1865, p. 770. Butler, Ann. Nat. Hist. 1867, p. 166; Ent.

Mo. Mag. 1868, p. 195; Catal. Satyr. Brit. Mus. p. 112 (1868). Marshall and de Nicéville,

Butt. of India, i. p. 170, pl. xi. fig. 25, ♀ (1883).

IMAGO.—Male. Upperside dusky olivescence ochreous-brown, darkest externally; cilia blackish alternated with ochreous-white. *Forewing* crossed by a dusky blackish indistinctly-defined *glandular fascia*, clothed with long narrow scales with tridentate or quadridentate tips, and numerous interspersed slender *androconia*, of similar length, with bulbous base and fine hair-like tasselled tip; the median vein and its branches at their base, and the submedian to near its end, lined with yellowish-ochreous; within the cell is a yellowish-ochreous oblique streak at its end, and a much less-defined streak across its middle; beyond is an irregular transverse discal and a similar submarginal series of yellowish-ochreous spots. *Hindwing* with two outer curved-rows of yellowish-ochreous spots and an intervening discal series of ill-defined black oval spots. Underside dark brown. *Forewing* with three zigzag bars across the cell, and two costal streaks beyond ochreous-white; base of median vein

with its veinlets and of the submedian, a patch below the cell, and the two outer lower series of spots, as above, ochreous-yellow; the two sets of spots between the medians having an intervening black spot, and above the upper ochreous spot are two more-or-less-developed subapical ocelli, the apical area being grey-speckled; a slender pale-bordered blackish marginal line. *Hindwing* with two irregular subbasal series of yellowish-ochreous ringlet-spots with an intervening transverse zigzag blackish-brown fascia, and a similar zigzag and angulated discal fascia, beyond which is an outer recurved-series of eight round ocelli, the seventh or anal being duplex, and the eight small and situated above the anal angle, the ocelli black with white pupil and ochreous-yellow outer ring; the basal markings bordered and the intervening outer area clouded with grey-speckles. *Body* dark brown; abdomen beneath brownish-ochreous; legs ochreous-brown; collar, sides of palpi, forelegs beneath, and middle and hind femora beneath ochreous-white; antennæ reddish.

Female. Upperside as in male, except that the markings are somewhat paler. Underside as in male.

Expanse, $2\frac{3}{8}$ to 3 inches.

HABITAT.—N.-W. and E. Himalayas.

DISTRIBUTION.—Col. A. M. Lang (Ent. Mo. Mag. 1864, 182) records having "taken specimens of this insect in Lower Kunawur, at 7000 feet elevation, and at Narkunda, near Simla, at about 9000 feet, in dark forests of oak, sycamore, and horse chestnut, affecting shade and pitching on trunks of trees." In his MS. notes, Col. Lang gives May and June as the months of capture. Major C. H. T. Marshall took it at Kajiar, near Chamba, in April (Butt. Ind. i. 171). Mr. A. Graham Young obtained it on the Tihir Pass and the Jamere Mountain, Kulu. On July 21st 1872 "it was in swarms round an oak tree on the top of a stony ascent" (Butt. Ind. 171). Major Hellard, in his Notes, records its capture at Simla in July. Mr. W. Doherty (J. A. S. Beng. 1886, 117) "took it at Khati and at Kapkot, in Kumaon, at from 7000 to 8000 feet; rare." According to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 321) it was "not rare on the Singalelah Range between Sikkim and Nepal at 9000 to 11,000 feet, in July, and common on Tendong, and in British Bhotan, near Rikisum, in August. It settles on ordure in the paths, and when disturbed flies quickly into the forest, but returns in a short time to the same place. Mr. O. Möller also notes its occurrence in March."

BLANAIDA PULAHOIDES (Plate 94, figs. 2, ♂).

Neope Pulaha, Elwes, Proc. Zool. Soc. 1891, p. 265.

Male. Upperside with the basal area of both wings paler, and the outer area more dusky, than in typical *B. Pulaha*; all the streaks and spots larger, broader,

more prominently defined, and of a conspicuously paler colour, all being pale-yellow. Underside. *Forewing* with the pale borders to the cell streaks and to the subapical markings, white; the discal spots and posterior streaks being also pale ochreous-white; the dark cell streaks are also sharply defined and with well-separated pale interspaces. *Hindwing* with brighter dark markings, paler ochreous borderings and lilacine-grey speckled edgings; the ocelli paler ochreous-ringed and the submarginal clouded-border bright fulvous.

Expanse, 3 inches.

HABITAT.—Naga Hills; E. Pegu.

DISTRIBUTION.—According to Mr. H. J. Elwes (P. Z. S. 1891, 265) this species was obtained by Mr. W. Doherty "in the Naga Hills, at 5000 to 8000 feet, July to August, and also found very abundant in the Karen Hills, East Pegu, at 4000 to 5000 feet elevation; March to April."

The illustration of this species on our Plate 94, fig. 2, represents a male from the Karen Hills.

CHINESE AND JAPANESE ALLIED SPECIES OF *BLANAI*DA.—*B. Armandi* (Satyrus Armandi, Oberthür, Etudes Ent. 1876, p. 27, pl. 2, fig. 5). *Habitat*, E. Tibet.—*B. fusca* (Neope Armandi, var. fusca, Leech, Entomologist, 1891, p. 68). *Habitat*, W. China.—*B. simulans* (Neope simulans, Leech, *id.* 1891, p. 66). *Habitat*, W. China.—*B. agrestis* (Satyrus agrestis, Oberthür Et. Ent. 1876, p. 27, pl. 2, fig. 3). *Habitat*, E. Tibet.—*B. albicans* (Satyrus albicans, Leech, Butt. Japan, China, etc., p. 54). *Habitat*, W. China.—*B. ramosa* (Neope ramosa, Leech, Ent. 1890, p. 29). *Habitat*, W. China.—*B. Goschkevitschii* (Lasiommata Gosch. Menétries, Catal. Mus. Petrop. Lep. p. 121, pl. x. fig. 4 (1857). Pryer, Lep. Japan, p. 32, pl. 9, fig. 11. *Habitat*, Japan.—*B. Nipponica* (Neope Nipponica, Butler, Ann. N. H. 1881, p. 133). *Habitat*, Japan.—*B. Japonica* (N. Japonica, Butler, *id.* 1867, p. 167). *Habitat*, Japan.—*B. Bremeri* (Lasiommata Bremeri, Felder, Wien. Ent. Monats. 1862, p. 28. *Syn.* Neope Romanovi, Leech, Entom. 1890, p. 29). *Habitat*, W. China.—*B. Oberthuri* (N. Oberthuri, Leech, Entom. 1891, p. 24). *Habitat*, W. China.—*B. Moorei* (N. Moorei, Butler, Ann. N. H. 1867, p. 166, pl. 4, fig. 7). *Habitat*, China.

Genus PATALA.

Differs from typical *Blanai*da. *Forewing* comparatively shorter, broader, and more triangular in form; the apex more pointed, and the cell broader; the *glandular fascia* is broader and more apparent, being clothed with extremely delicate long narrow ribbed-scales with bidentate or tridentate tips, and with several interspersed long slender *androconia* with truncated-bulbous base and hair-like tasselled-

tip. *Hindwing* shorter and more triangular in form, exterior margin less angulated. Upper and undersides dissimilar in markings.

Type.—P. Yama.

PATALA YAMA (Plate 94, fig. 3, ♂).

Zophoessa Yama, Moore, Catal. Lep. Mus. E. I. Company, i. p. 221 (1857), ♂ ♀. Butler, Catal.

Satyr. Brit. Mus. p. 109 (1868). Marshall and de Nicéville, Butt. of India, etc. i. p. 169 (1883).

IMAGO.—Male. Upperside olivescient ochreous-brown, somewhat ænescent and glossy in certain lights; cilia ochreous-white. *Forewing* with an indistinctly perceptible transverse short broad lower-discal dusky-cinereous *glandular fascia*, which is clothed with extremely delicate long narrow ribbed-scales with bidentate or tridentate tips, and several interspersed long slender *androconia* with truncated-bulbous base and fine hair-like tasselled-tip, and also with a few long fine hairs; beyond which are three very indistinct dusky-brown superposed subapical spots, and a similar indistinct dusky-brown broad marginal border; on the costa before the apex are two small ochreous-white intersected spots. *Hindwing* with an ill-defined discal-series of five dusky-brown pale-bordered rounded spots, and a broad dusky-brown marginal border. Underside paler. *Forewing* with four dark-brown bars with intervening ochreous-white bars crossing the cell from the costa; a dark-brown transverse-discal sinuous-bordered wavy band, a series of five brown ocelli (the upper one being obsolescent) each with a minute white pupil, a pale olivescient-ochreous ring, and then a narrow brown outer ring; followed by a brown submarginal fascia and a slender straight marginal line; the intervening area between the discal and submarginal fascia being pale olivescient-ochreous and brown speckled, with the two costal whitish spots before the apex, as on upperside. *Hindwing* crossed by two irregular ochreous-white bordered dark-brown short subbasal broken bands from the costa, a similar-coloured transverse discal irregular zigzag band, followed by a series of seven prominent black ocelli, the seventh being duplex, each with a white pupil, dark-ochreous ring, and then a dark-brown ring; beyond these is an interrupted dark-brown submarginal fascia, and a slender marginal line, both of which are posteriorly pale-ochreous bordered from the upper median vein; the subbasal intervening spaces thickly speckled with pale-ochreous scales, and the area bordering the ocelli with purplish-ochreous scales.

Female. Upperside similar to the male, except that on the forewing there is an indistinctly-defined transverse nearly-erect narrow dusky-brown fascia. Underside as in the male; sometimes the forewing has an additional or lower ocellus between the median and submedian vein. *Body* beneath pale ochreous-brown; fore-legs, middle and hind femora beneath pale-ochreous; collar, and sides of palpi ochreous-white; antennæ reddish-ochreous, with blackish terminal band.

Expanse, $2\frac{2}{3}$ to 3 inches.

HABITAT.—N.-W. Himalayas.

DISTRIBUTION.—“This species occurs at Simla, at 7000 feet elevation, in June. The late Mr. E. T. Atkinson obtained it in the outer ranges of the Himalayas, in Kumaon.” (Butt. Ind. i. p. 169.) Specimens from Masuri were in the collection of the late Mr. W. S. Atkinson.

PATALA YAMOIDES (Plate 94, fig. 4, ♂.)

Zophoessa Yama, Marshall and de Nicéville, Butt. of India, i. pl. x. fig. 21, ♂.

IMAGO.—Differs from typical *P. Yama* from the North-Western Himalayas in being somewhat larger. Upperside much darker brown, the marginal border on both wings comparatively broader, and that on the hindwing darker and more conspicuous, and the cilia very prominent; the spots are darker, and the lower spots on the hindwing also larger. Underside also darker coloured throughout and with much more prominently pale greyish-ochreous borders to the markings. *Forewing* with the pale bar crossing the cell somewhat less obliquely, the outer bar straight (not recurved), the discal fascia is broader, much darker, and undulated (not straight), the subapical ocelli are larger. On the *hindwing*, the short dark sub-basal band is broader and extends unbroken to the costa, the parallel contiguous outer band is also nearer to it and straight in its course, the interspace between these two bands is uniformly pale ochreous-white its entire length; the outer discal dark irregularly angulated fascia is broader; the ocelli darker and larger, the two upper being situated more obliquely inward, and all are less definitely pale ringed, there is also an intervening interrupted pale line between the upper ocelli and the outer marginal black line; the pale ochreous-white basal bordering to the marginal line is also broader.

Expanse, $3\frac{2}{3}$ to $3\frac{4}{5}$ inches.

HABITAT.—E. Himalayas; Bhotan; Khasia Hills; Silhet; Naga Hills; Upper Burma.

DISTRIBUTION.—In Sikkim, according to Mr. H. J. Elwes (Tr. Ent. Soc. 1888, 321) “this species seems rare. It occurs on Tendong, at 6000 to 7000 feet in June and July, and to the Eastward, where I saw a single specimen at Rikisum in British Bhotan, in August. Mr. Knyvett’s collectors also found it commoner near Buxa, in Bhotan.” “It also occurs in the Khasia Hills, in May” (Butt. Ind. i. 169). Mr. Elwes also records it (P. Z. S. 1891, 254) as being “common in the Naga Hills, and near Bernardmyo in Upper Burma.”

PATALA BHIMA (Plate 94, figs. 5, 5a, ♂ ♀).

Neope Bhima, Marshall, Journ. Asiatic Soc. Bengal, 1880, p. 246. Marshall and de Nicéville, Butt. of India, etc. i. p. 172, pl. xi. fig. 26, ♀ (1883). Manders, Trans. Ent. Soc. Lond. 1890, p. 518.

Neope Muirheadi, var. *Bhima*, Elwes, Proc. Zool. Soc. 1891, p. 266.

IMAGO.—Male. Upperside pale olivescient ochreous-brown; marginal line indistinctly pale bordered; cilia pale ochreous-white. *Forewing* with a broad transverse discal indistinctly-defined darker *glandular fascia* clothed with a few long narrow scales with acute bidentate or tridentate tips, and very numerous interspersed long slender *androconia* with lengthened truncated-base and fine hair-like tasselled-tip, and also a few fine hairs; beyond which is an outer discal series of pale olivescient-yellow elongated spots situated between the veins, the one between the radials and also that between the upper medians enclosing an oval black spot. *Hindwing* with a series of four prominent black oval spots, with a pale olivescient-yellow outer ring, above which is a subapical small incipient similar spot, and at the anal angle an indistinct duplex spot. Underside ochreous-grey speckled with brownish-ochreous scales. *Forewing* with three sinuous brown bars crossing the cell, the basal one being narrow, the next broad and catenulate, the outer one broad and zigzag; crossing the discocellulars are two small brown spots; beyond is a broad transverse discal brown band, which is traversed by a very slender sinuous inner pale line, its outer edge being recurved and broadly bordered by pale ochreous-grey; following is a series of four prominent ocelli, each with large black centre and white pupil, an ochreous-yellow ring, and then a brown bordering extending laterally to the costa, beyond which is a brown submarginal and marginal line with pale ochreous-grey borders. *Hindwing* with a basal transverse series of three small brown rings, two subbasal pale-bordered brown zigzag interrupted bands, and a similar recurved discal continuous band, the latter with a prominent pale ochreous-grey outer border, followed by a recurved series of eight prominent ocelli, the seventh and eighth being conjoined but both well developed, each with a black centre and white pupil, an ochreous-yellow ring and an outer dark-brown ring, all again outwardly bordered by brown speckles; marginal lines dark-brown, sinuous. *Body* beneath pale ochreous-grey; legs above brown, ochreous-grey beneath; collar and sides of palpi ochreous-white; antennæ brown with blackish subterminal band and reddish-ochreous tip.

Female. Upperside pale olivescient ochreous-brown. *Forewing* with an ill-defined narrow pale brownish-ochreous transverse discal recurved fascia, an outer discal row of four, sometimes with five, prominent black oval spots, the upper one being situated between the radials, the lowest, when present, between the lower median and submedian vein, the upper second generally small and imperfectly developed, the upper first, the third and fourth large and of nearly equal size;

each spot is encircled by a pale ochreous-yellow ring, these rings being broadened exteriorly and altogether forming a nearly straight submarginal edge to the series of ocelli, the yellow extending above the ocelli to the costa before the apex. *Hindwing* crossed by an ill-defined pale bordered angular discal line, followed by an outer series of five oval black spots, each encircled by a pale ochreous-yellow outer ring, the latter ring more or less broadened exteriorly, and either touches or extends to near the dark-brown submarginal sinuous line; marginal line slender, brown. Underside as in the male, except that the pale border to the discal brown band is broader, and on the hindwing there is, in some specimens only, an additional small well-formed ocellus situated at the end of the discal band above the anal angle.

Expanse, ♂ $2\frac{7}{8}$, ♀ 3 to $3\frac{2}{3}$ inches.

HABITAT.—Burma.

DISTRIBUTION AND HABITS.—We are indebted to Capt. C. T. Bingham for the discovery of this species, "two females being taken in Upper Tenasserim in the Upper Thoungyeen forests in March and April" (Butt. Ind. i. 173). Dr. N. Manders (Tr. Ent. Soc. 1890, 518) "obtained two males and a female at Yatsouk and Bogeathat, at the north end of the Nyoungwe Valley in the Shan States; being found in open scrub-jungle, where the trees are of medium size. It is fond of settling in the middle of the road, and then flying off into the jungle to settle on a tree-trunk, and is consequently difficult to catch." Capt. E. Y. Watson (J. Bombay Nat. Hist. Soc. 1891, 34), during the Chin-Lushai Expedition of 1889-90, obtained it "on the road from Pauk to Tilin in October and November, and at Tilin also in November, April, and May. Those caught at the end of the year were in poor condition. The spring brood appeared about the middle of April, and did not differ in markings from the autumn brood. It settles almost invariably on tree-trunks, on which I usually obtained it in the very early morning. It is crepuscular in its habits, but does not seem to frequent very dense jungle. When seen either at rest or on the wing, this species seems altogether out of place in this fauna, and one would rather expect to find it sitting on stones in the hills in company with *Hipparchus*. It rests with its wings closed over the back, its underside harmonizing well with the bark of tree-trunks."

Mr. H. J. Elwes (P. Z. S. 1891, 266) records "several specimens taken by Mr. W. Doherty in the Karen Hills and at Momeit, Upper Burma, at 1500 to 2000 feet."

CHINESE ALLIED SPECIES OF *PATALA*.—*P. Muirheadi* (Neope Muirheadi, Felder Wien. Ent. Monats. 1862, p. 28, *Syn.* Debis Segonax, Hewits. Ex. Butt. Deb. pl. 1. f. 5, N. Segonacia, Oberthür, Et. Ent. 1881, p. 14, pl. 7, fig. 4). *Habitat*, China.—*P. Christi* (Neope Christi, Oberthür, Et. Ent. 1886, p. 25, pl. 3, fig. 18, ♀). *Habitat*, E. Tibet.

The following is an allied form.

Gen. Nov. NINGUTA.—Wings large, short, very broad, basal area densely hairy.

Male. *Forewing* subtriangular; costa arched, apex obtusely rounded, exterior margin slightly oblique, wavy; cell broad; discocellulars outwardly-recurved, upper radial from angle close to subcostal, lower radial from the middle; median branches widely separated. *Hindwing* broadly subovate; exterior margin convex, obtusely scalloped, anal angle rounded; cell broad; discocellular angular in its middle, radial from the angle; middle median emitted from beyond end of the cell; submedian and internal vein running close together for half their length, the latter then recurving to abdominal margin above the anal angle, their proximity thus causing a *longitudinal fold* of the membrane on the upperside of the wing, this fold being there *overlapped* for a portion of its length by *elongated spatular-tipt hairs*. Palpi densely clothed in front, apical joint long. Antennæ short, with an imperceptibly elongated slender tip.

TYPE.—*Schrenkii* (Pronophila Schrenkii, Menétr. Bull. Acad. Petr. 1859, p. 215. Schrenk's Reise Amur. Lep. p. 32, pl. 3, f. 3 (1859). Leech, P. Z. S. 1887, p. 426. Lethe Schrenki, Elwes, P. Z. S. 1881, p. 908. *Habitat*, Mount Bureia; Corea; Japan.

ADDENDA ET CORRIGENDA.

- Page 3. Line 10 from bottom, for *microscopic* read *microscopic*.
 „ 132. Line 20 from top, for *Isamia Choë* read *I. Chloë*.
 „ 153. Line 5 from bottom, for *subcostal* read *submedian*.
 „ 164. *Gareris Sanatana* (Dry-season brood). Add the following as a synonym, viz., *Mycalasis Antimus*, Frivaldszky, Term. Fuz. Magyar, Nem. Mus. p. 40, pl. 4, fig. 5 (1886).
 „ 254. *Lethe Europa*. Add to Plate 82, figs. 1 b. and 1 c.

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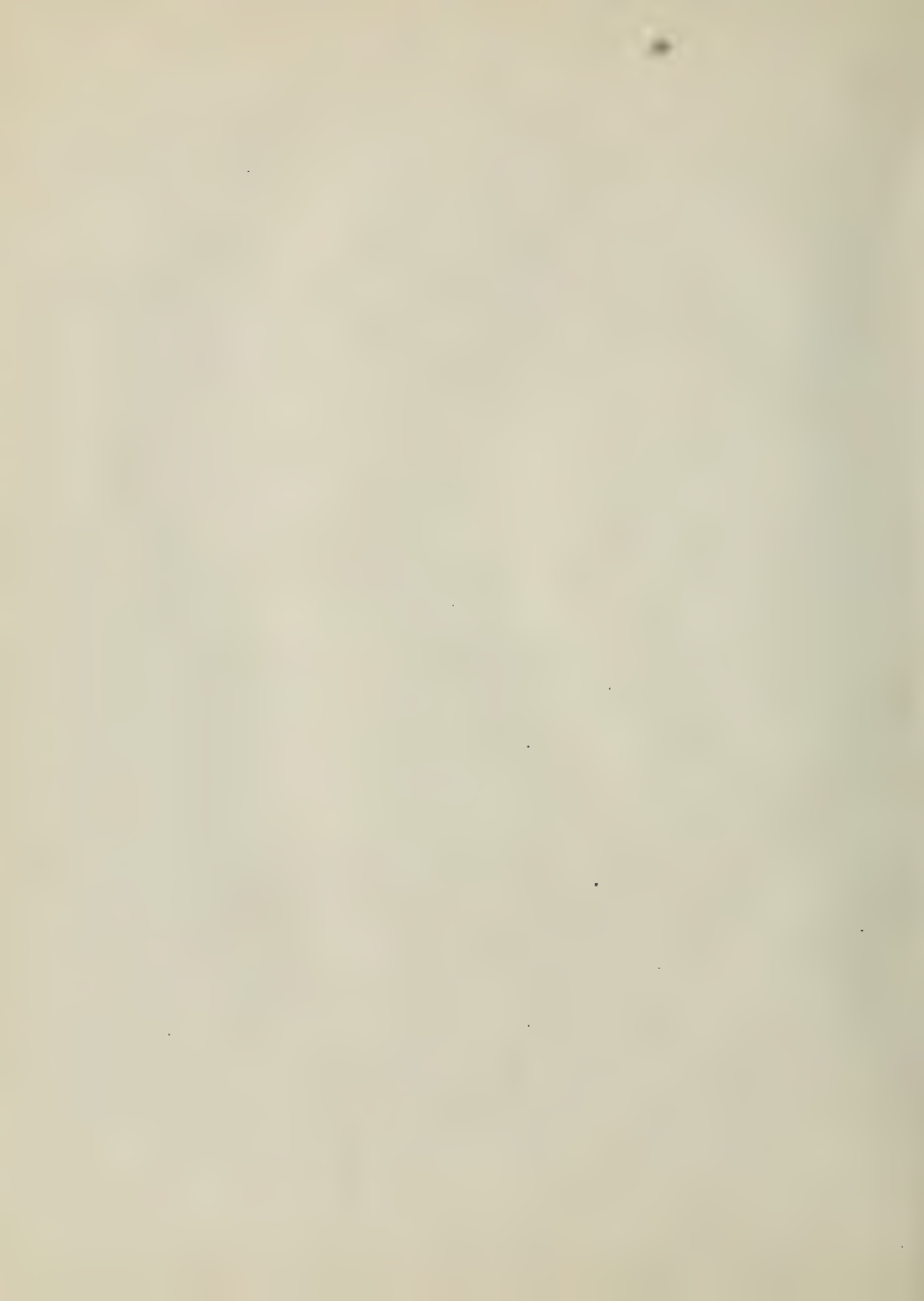
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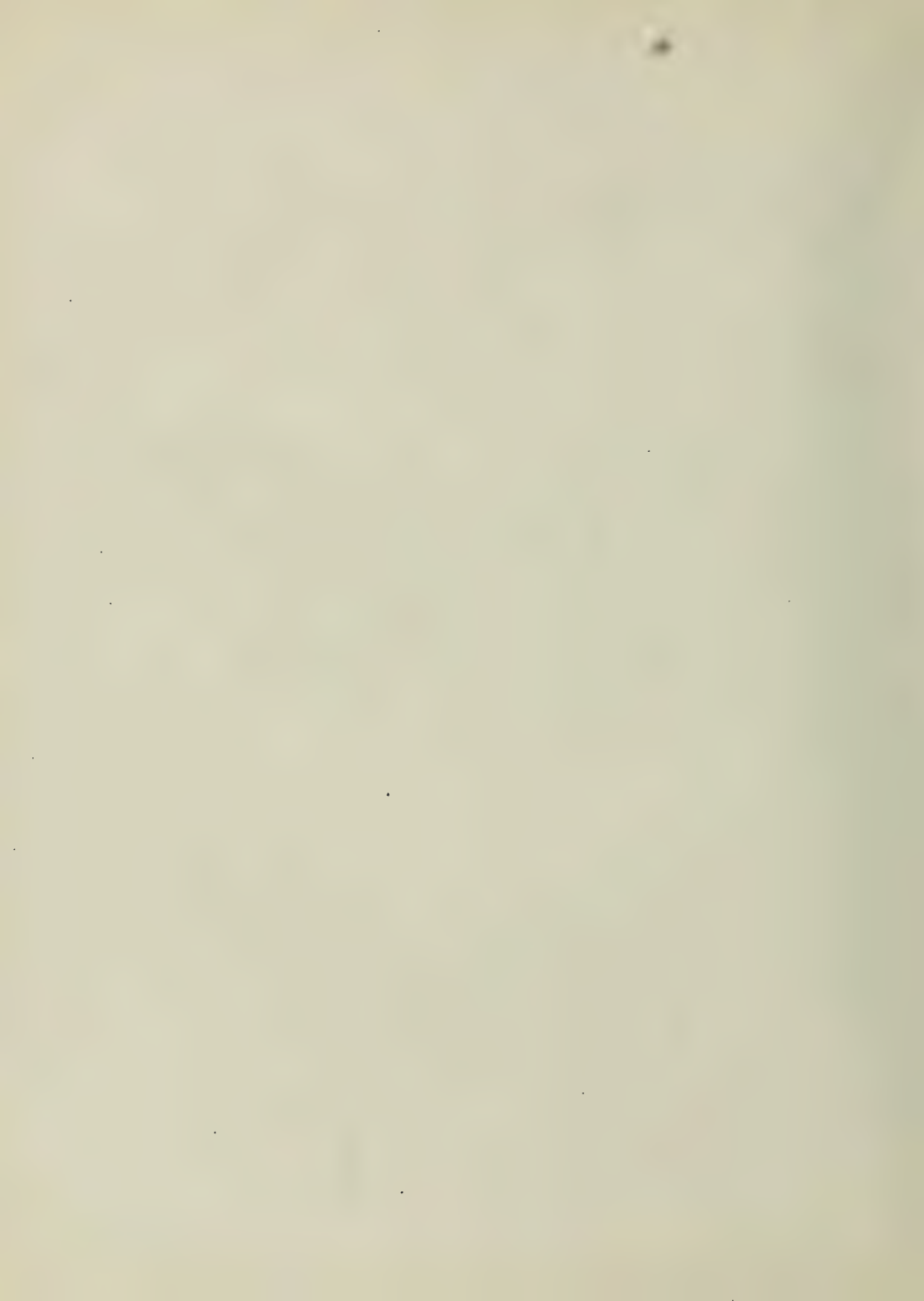
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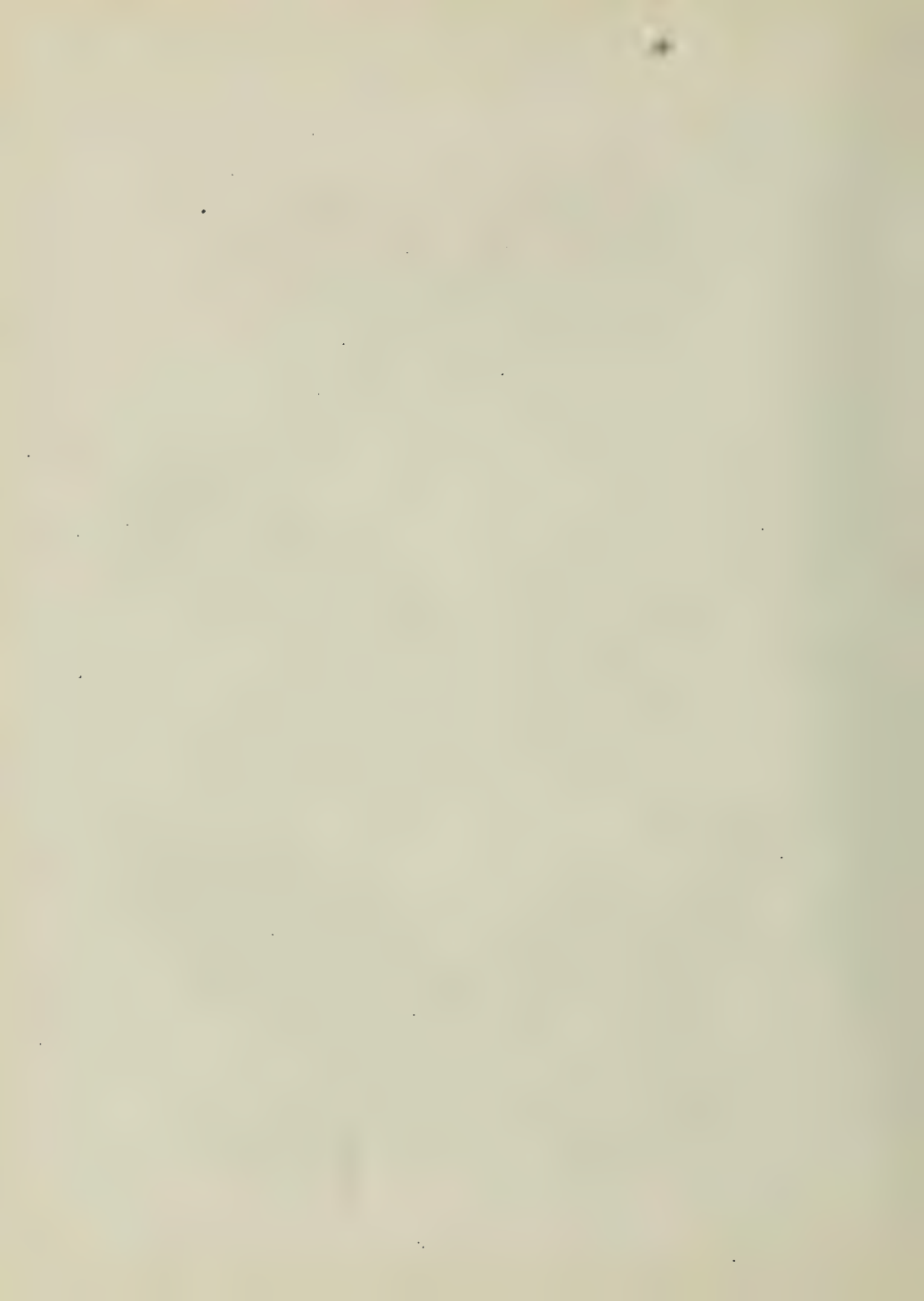
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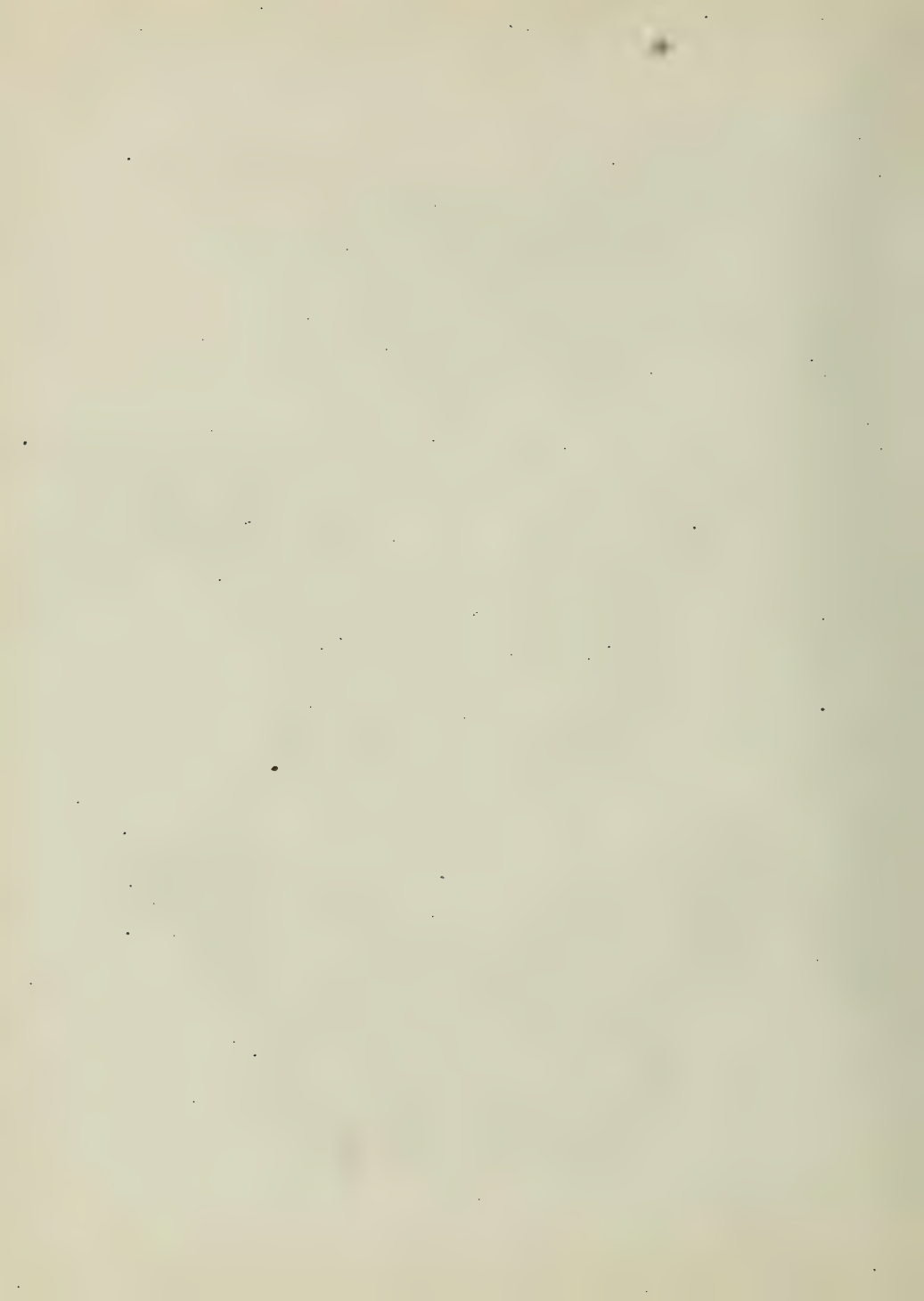
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2.



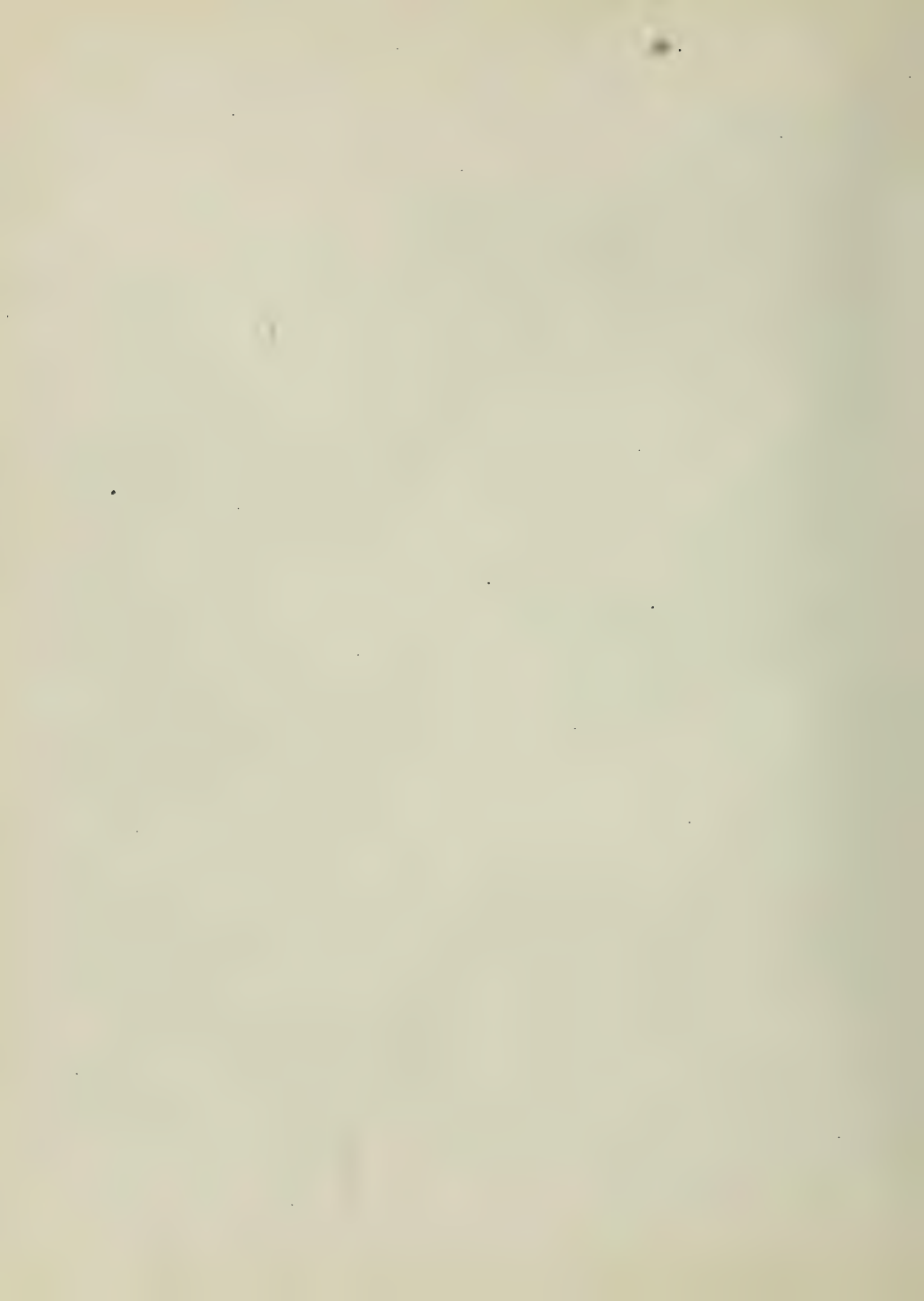
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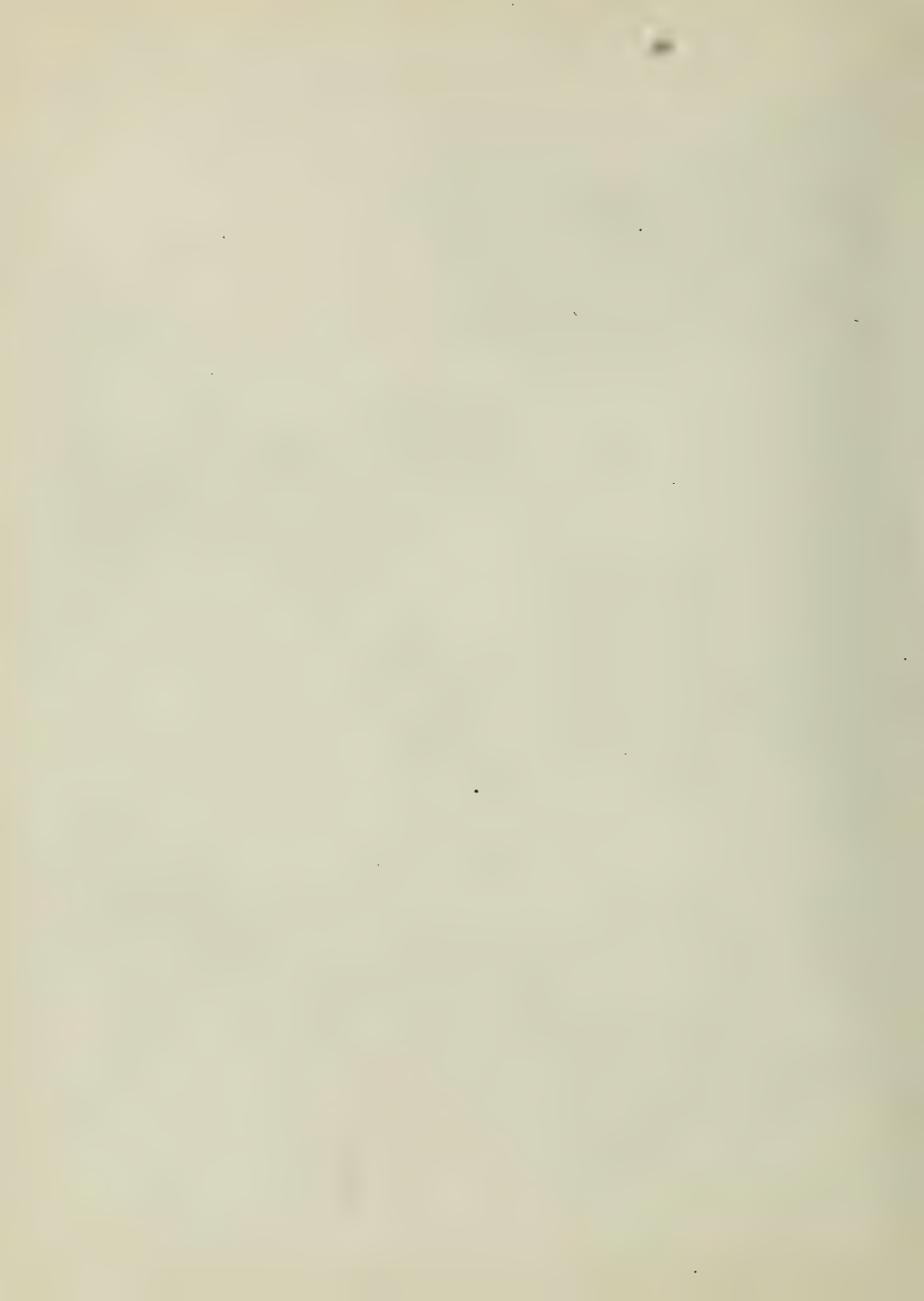
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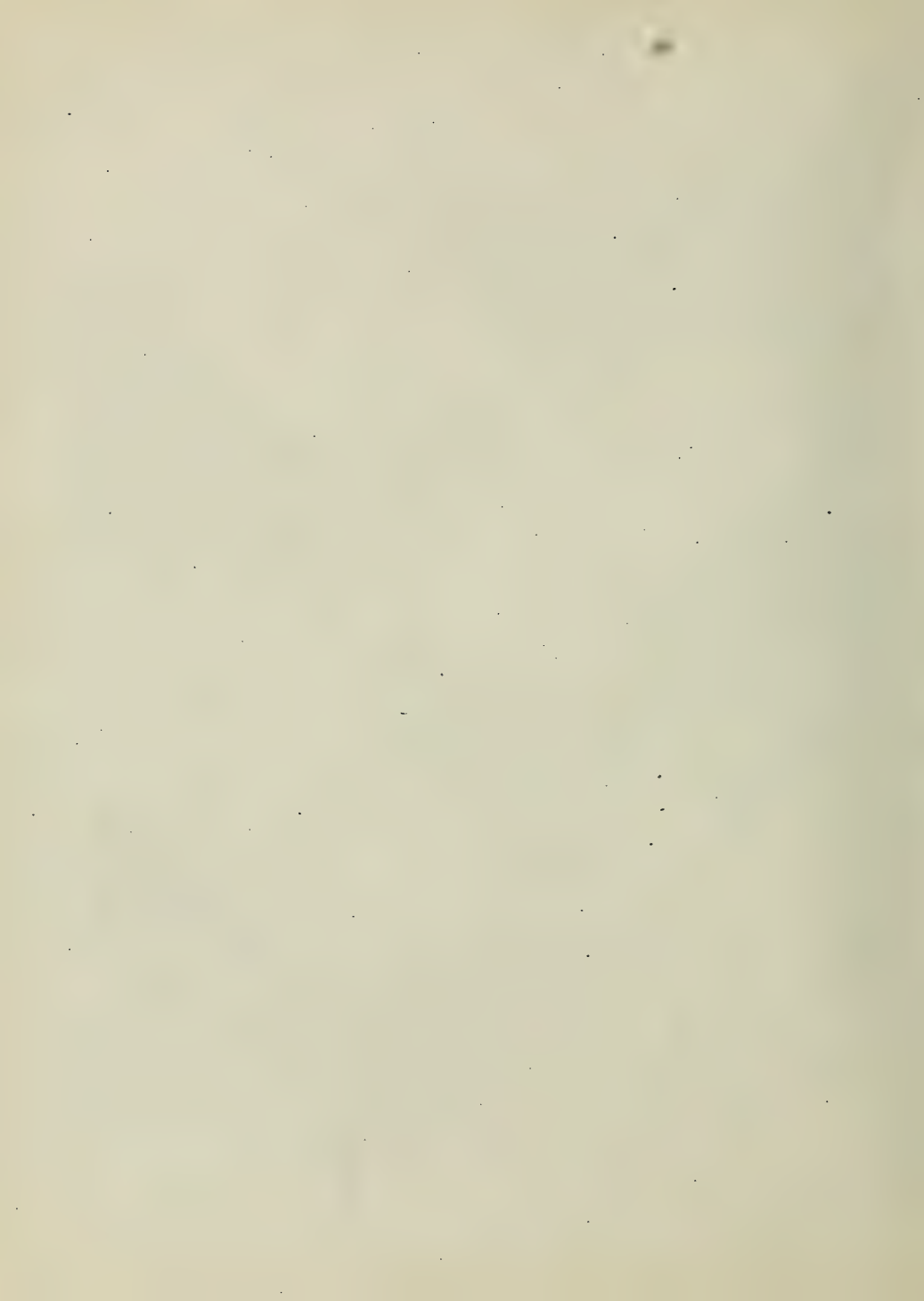
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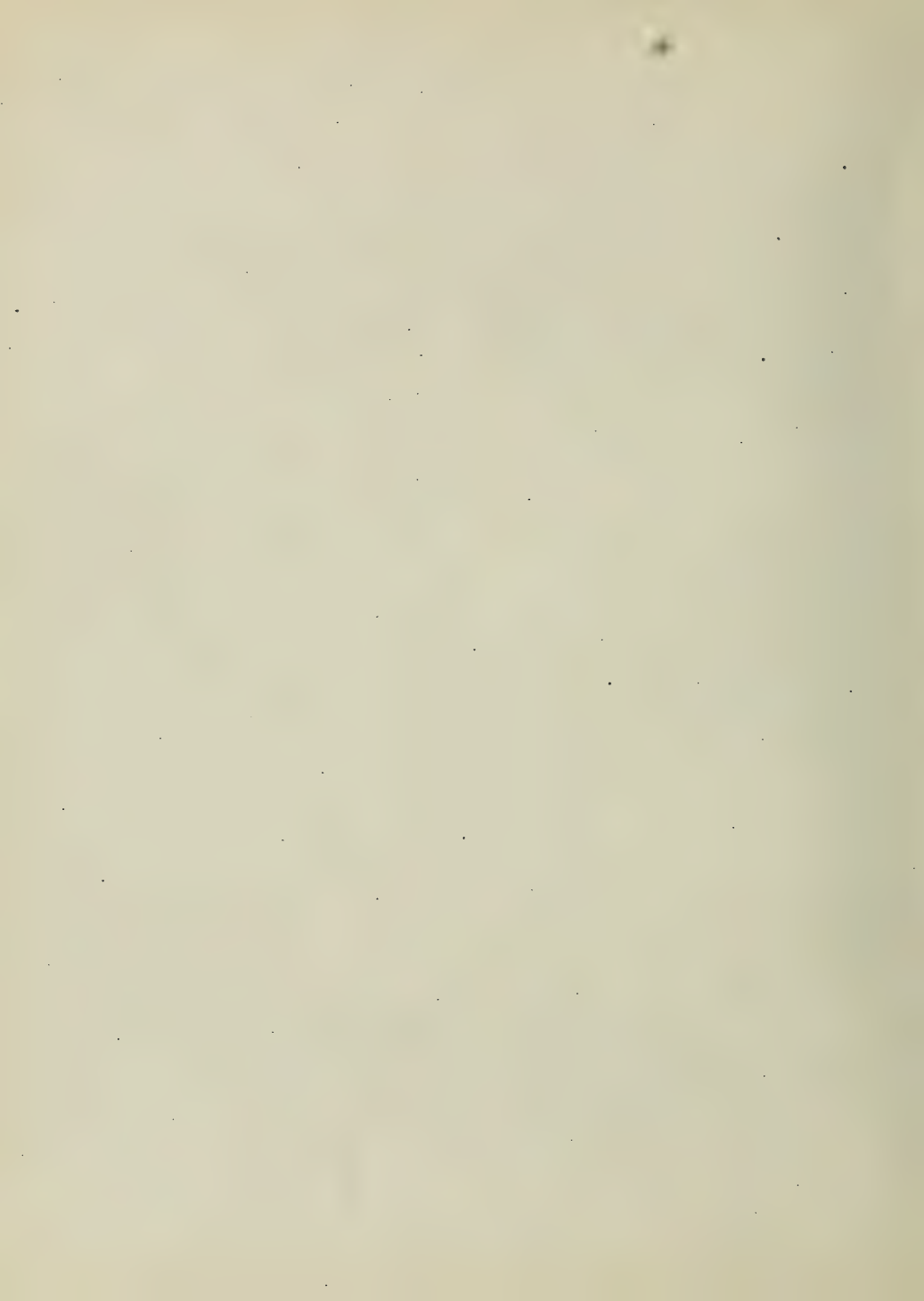


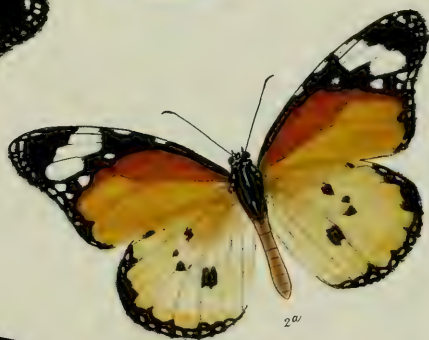


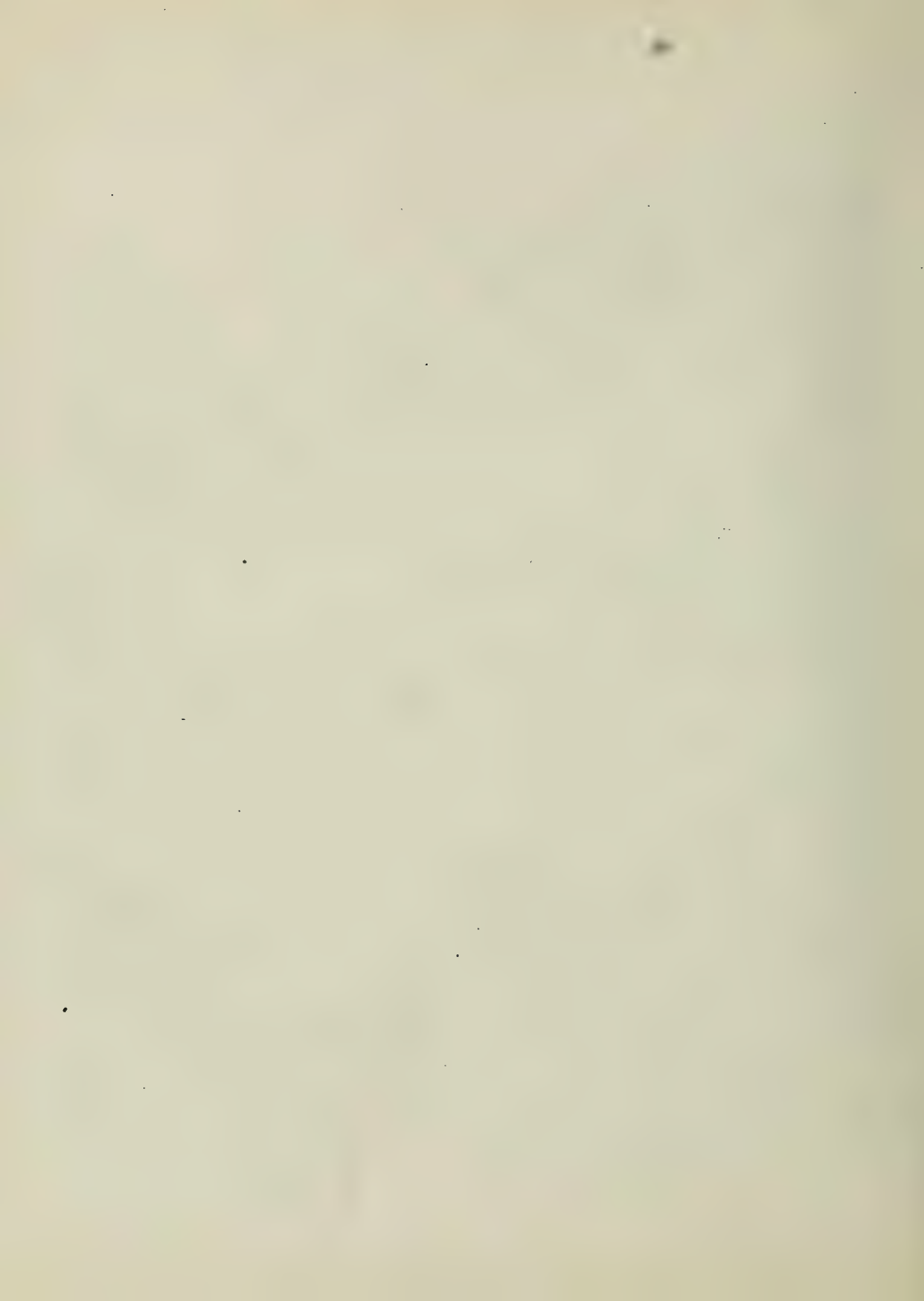












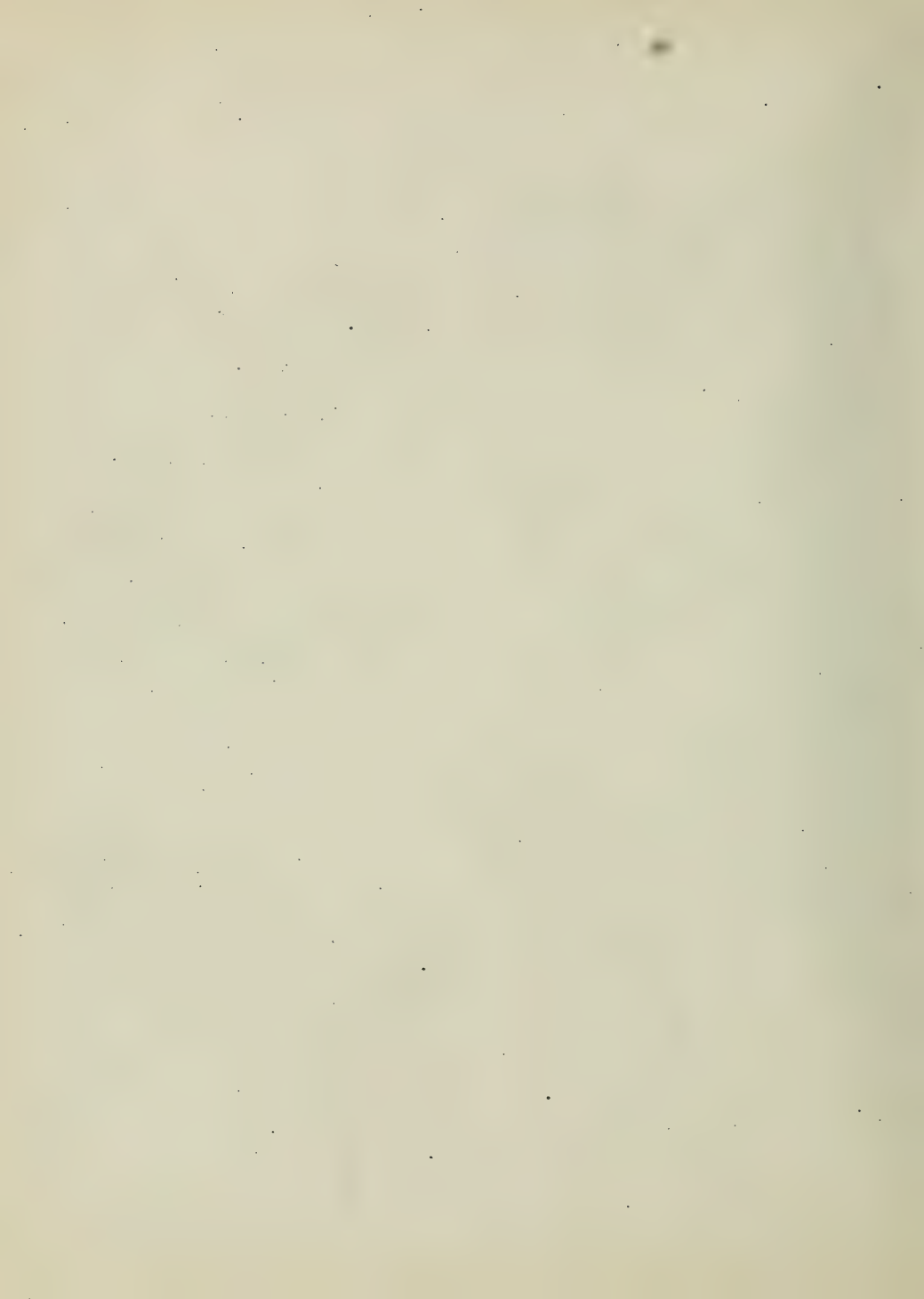


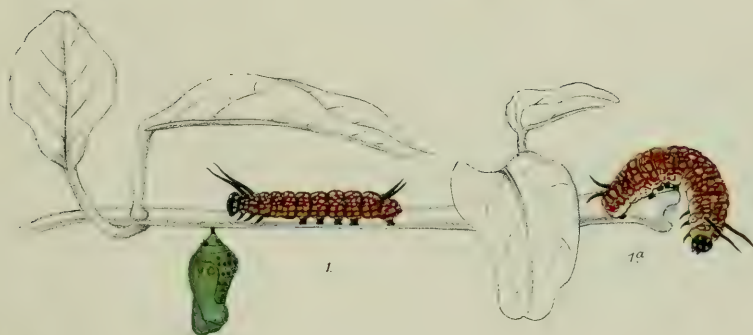


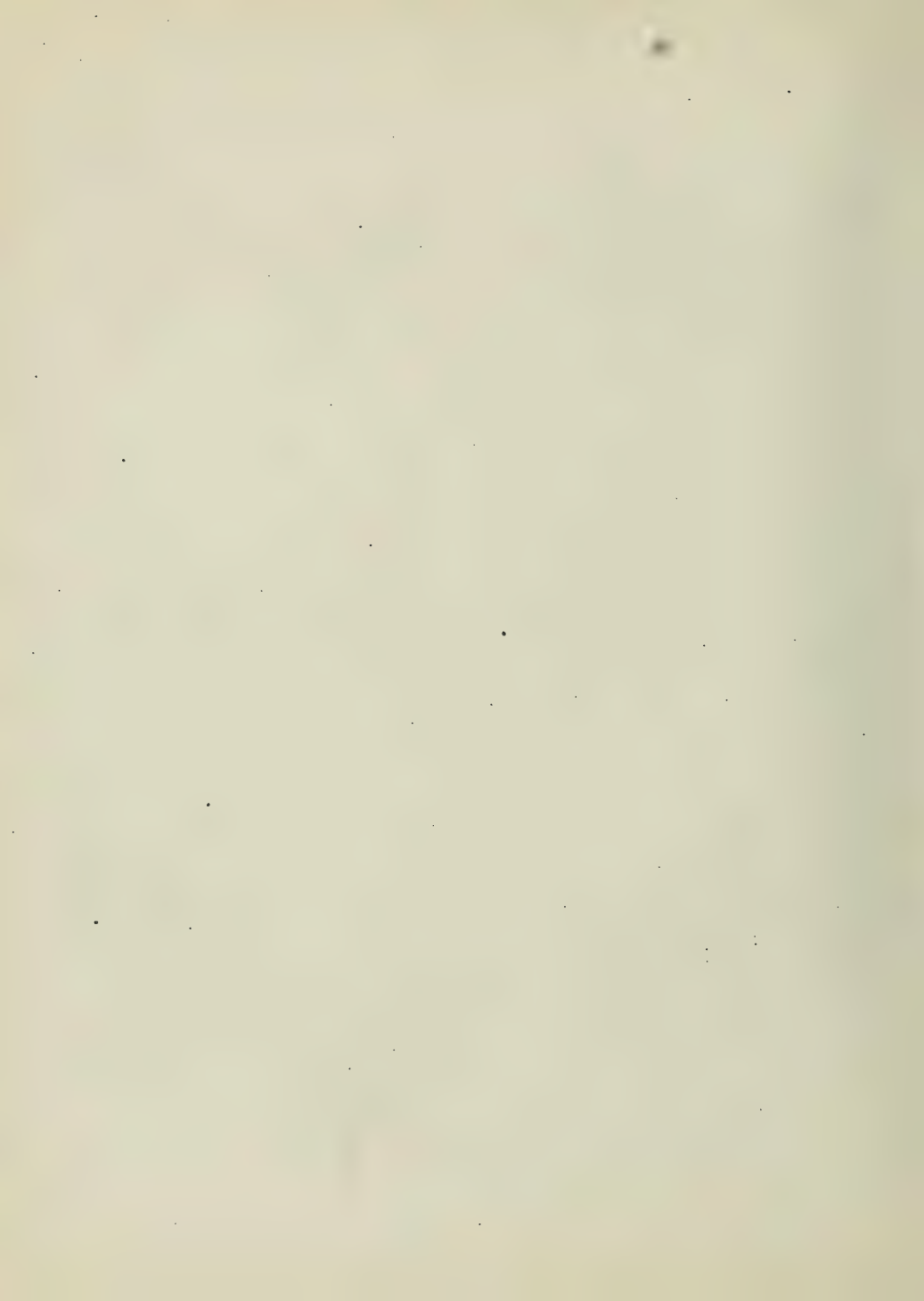




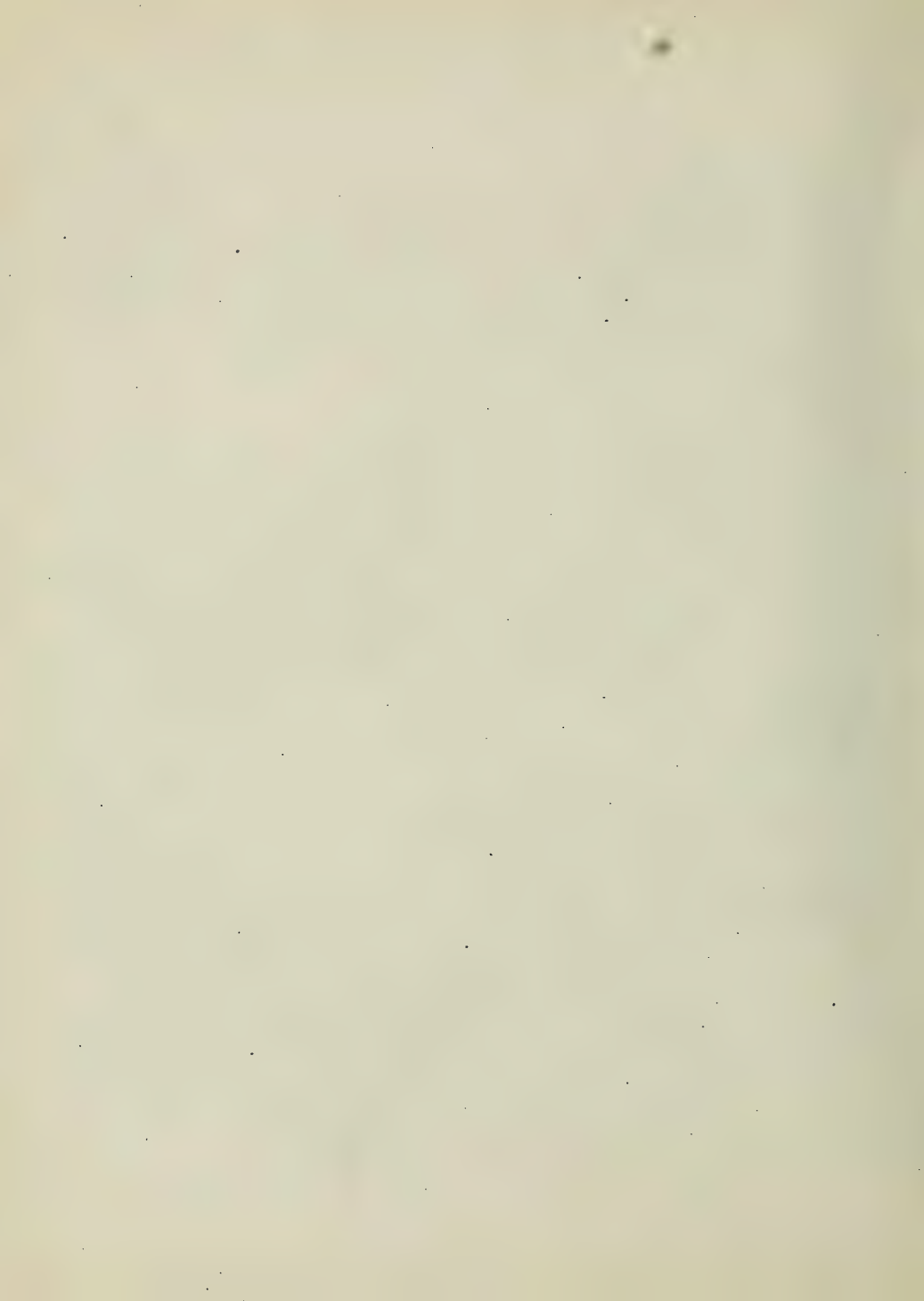








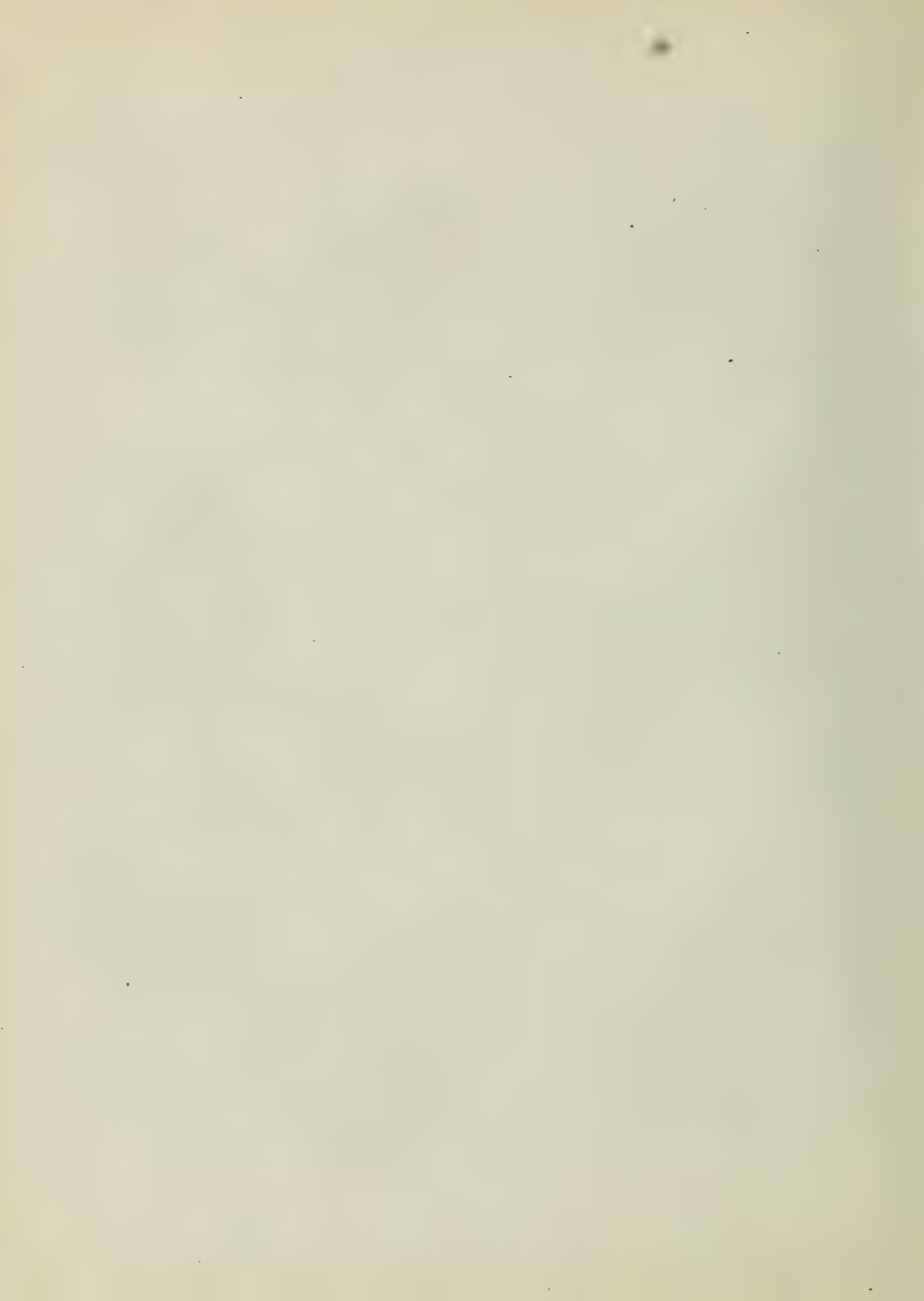




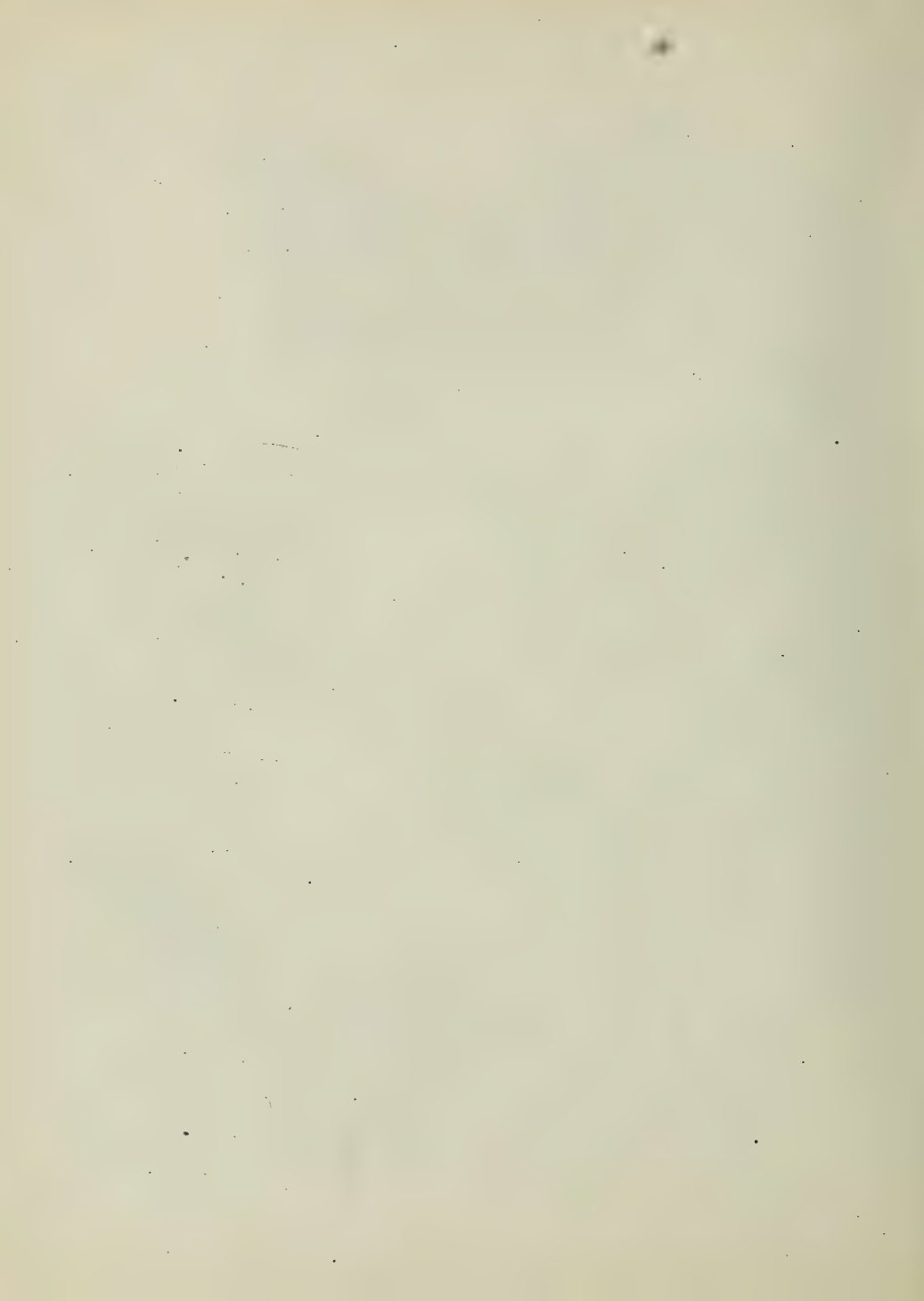














1.



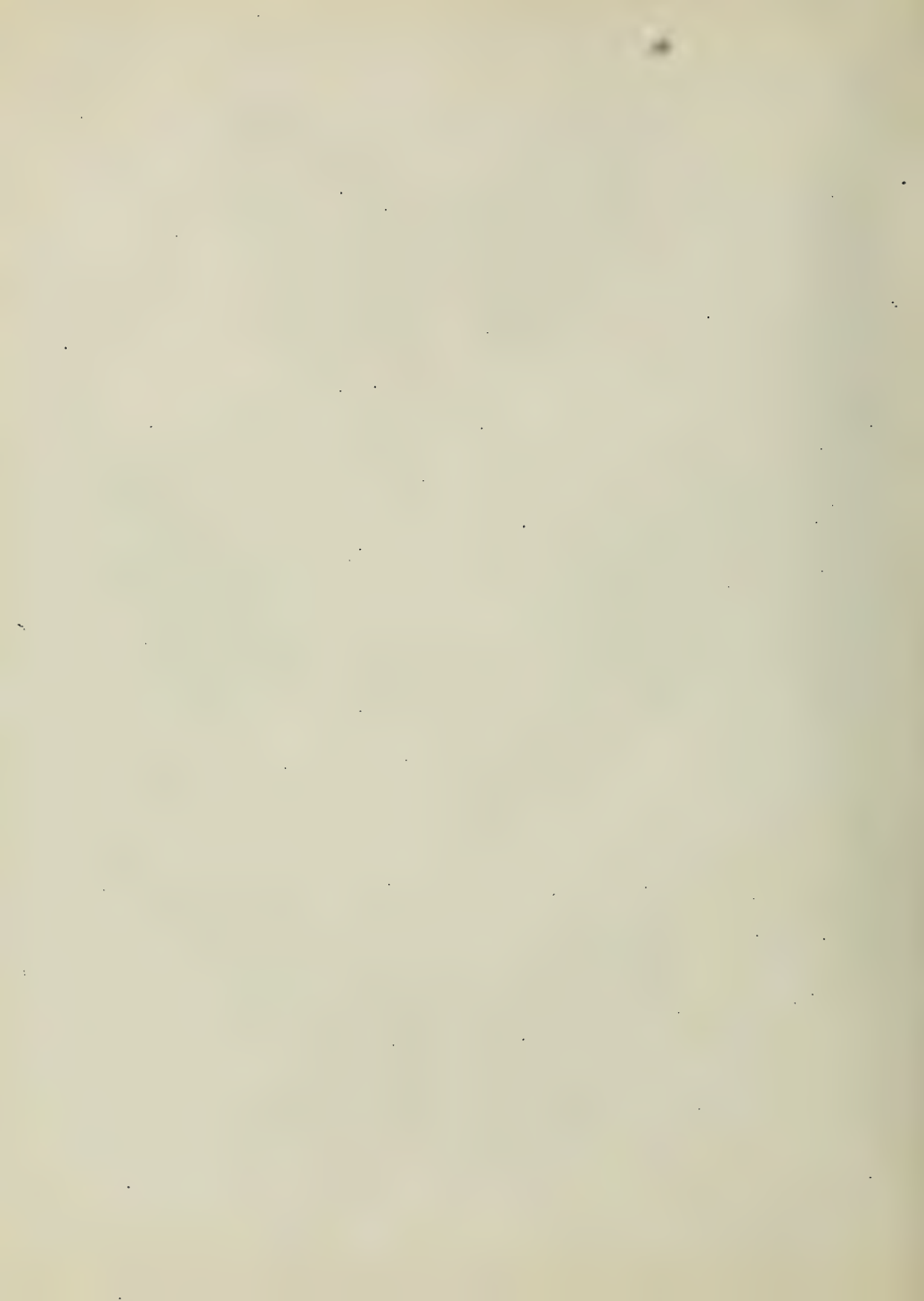
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7a.



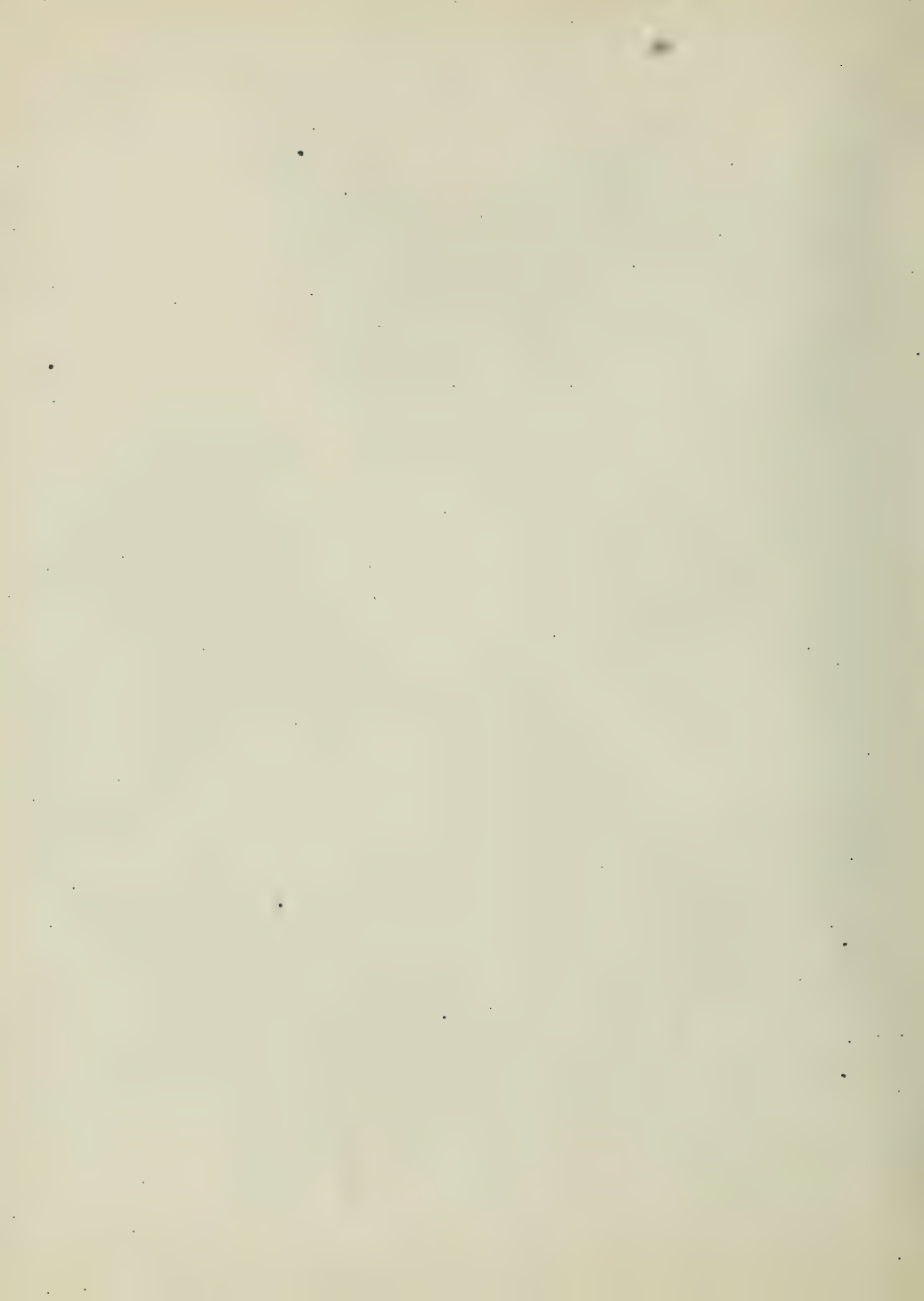
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7d.





7.



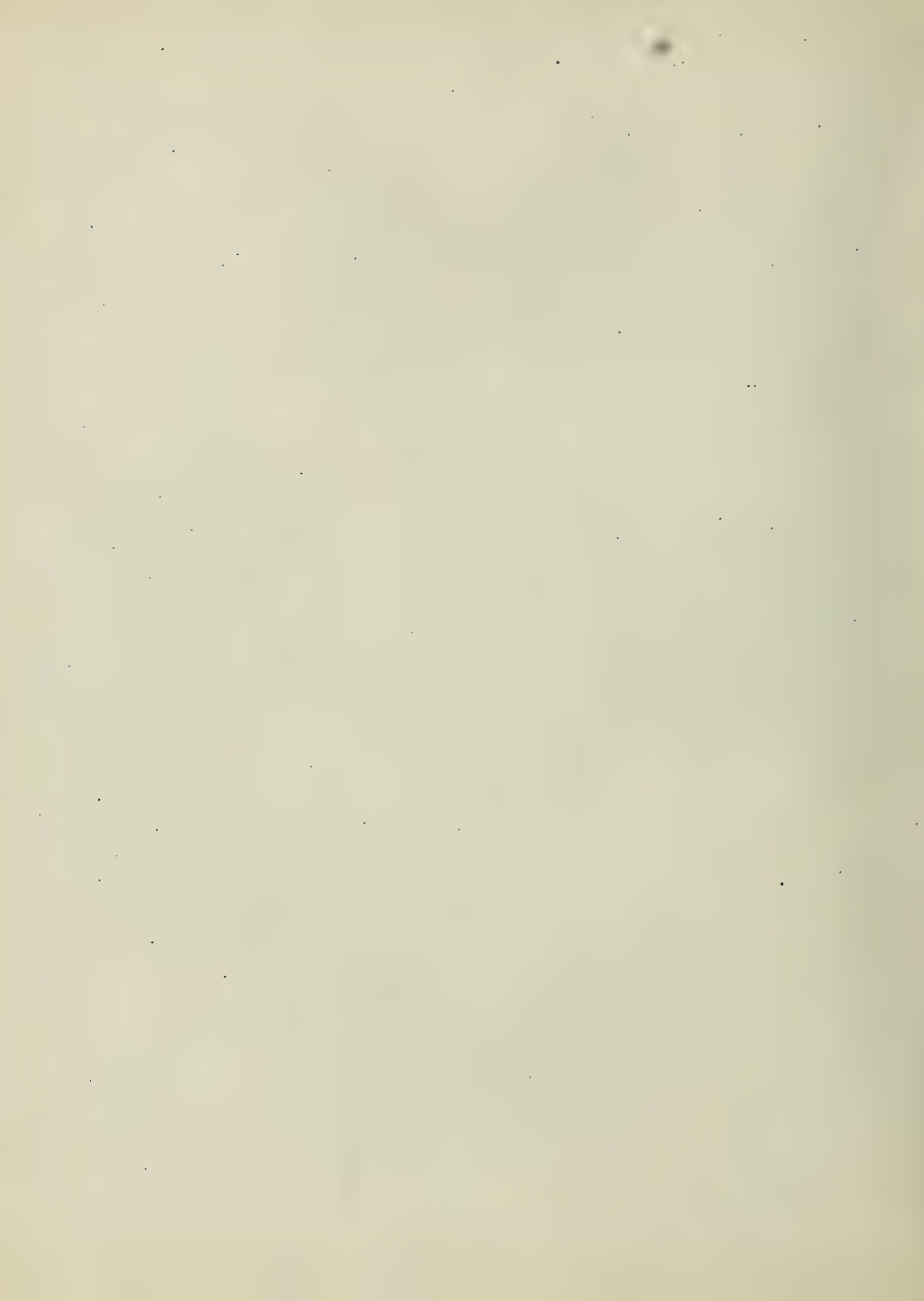
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7b



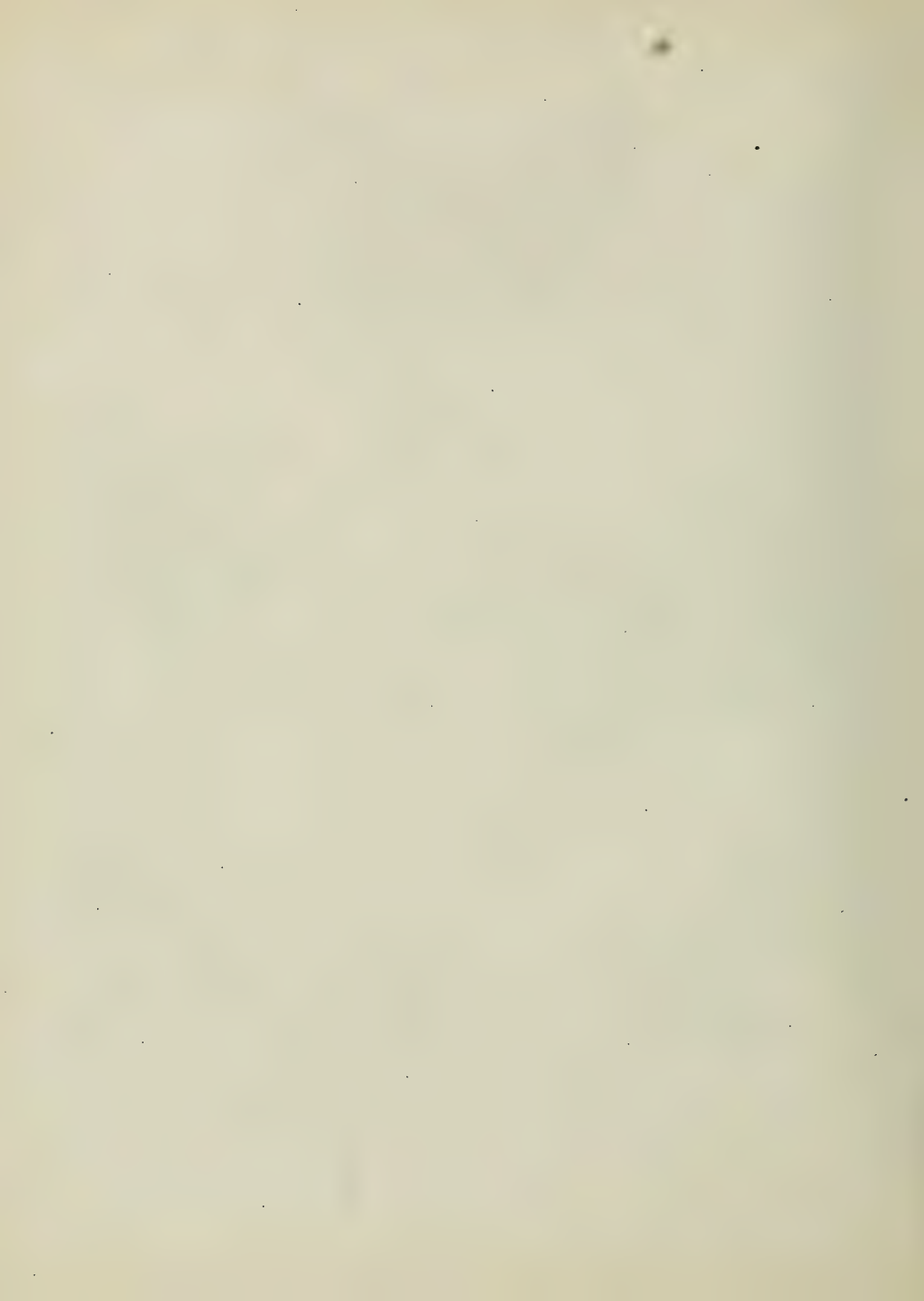
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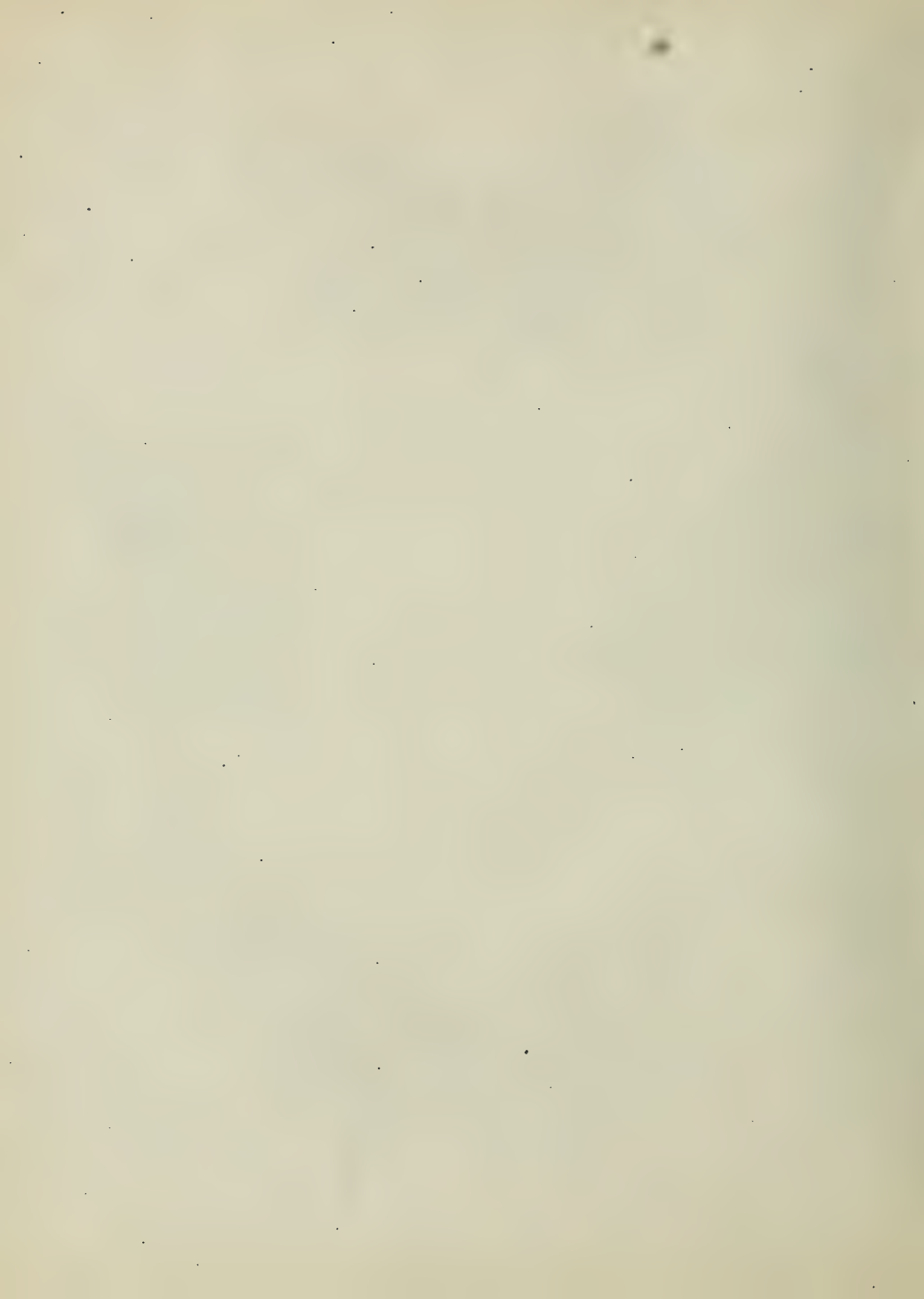
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7.^c



7.^b





1b



1a



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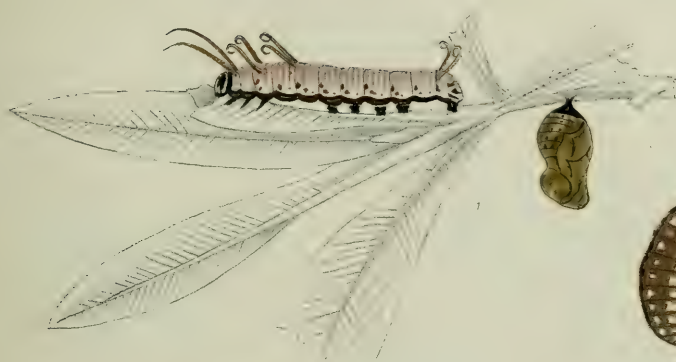


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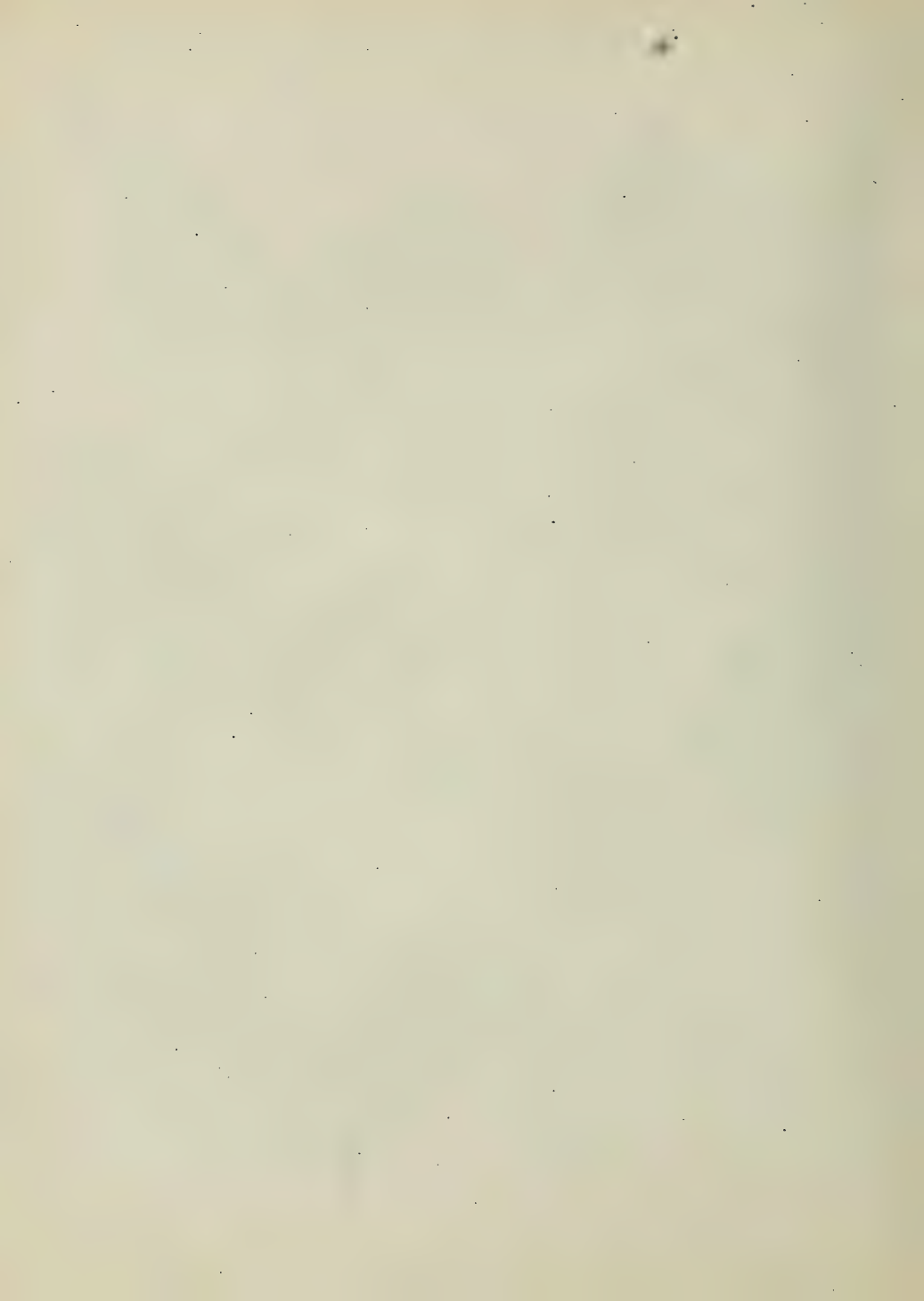
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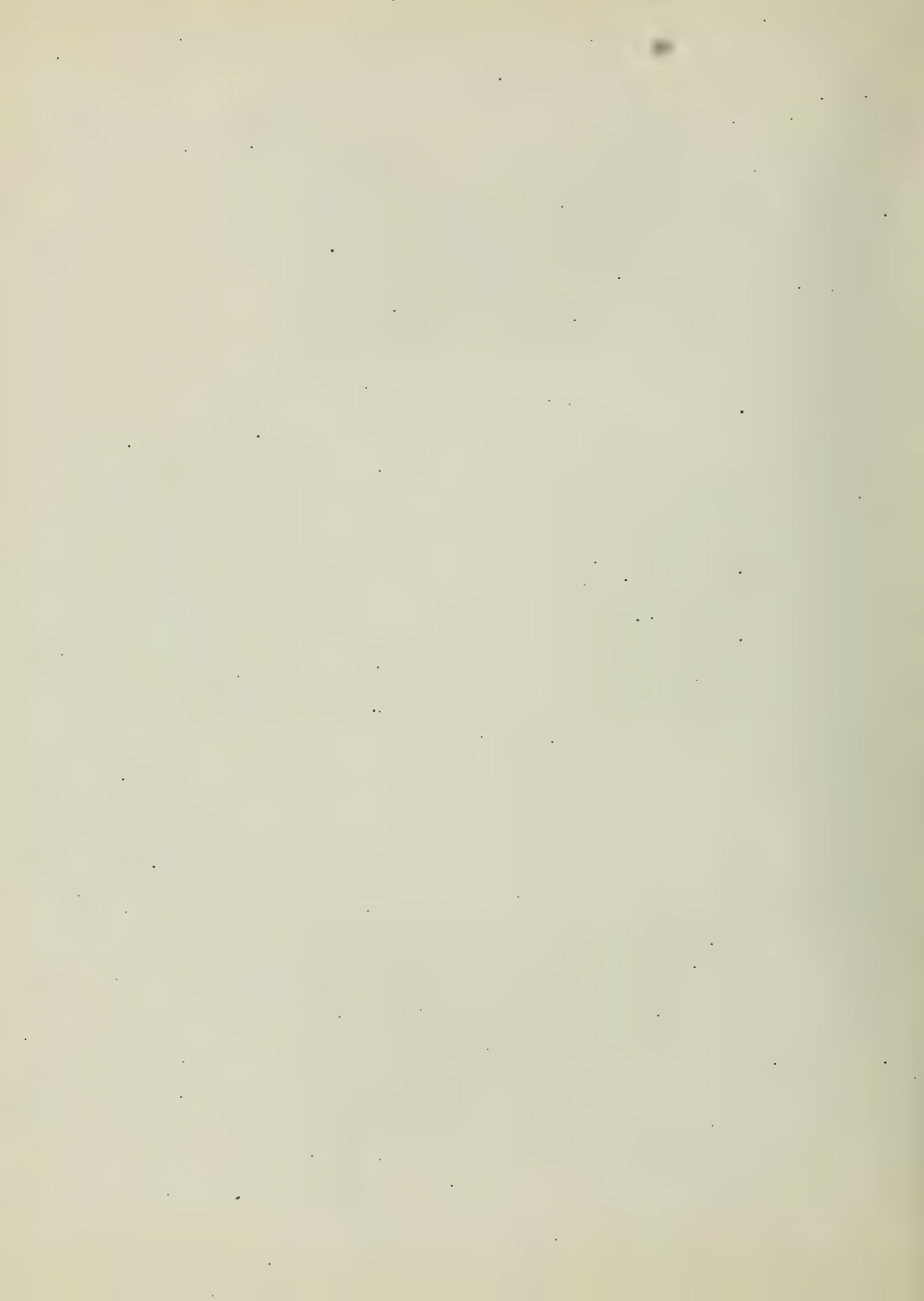
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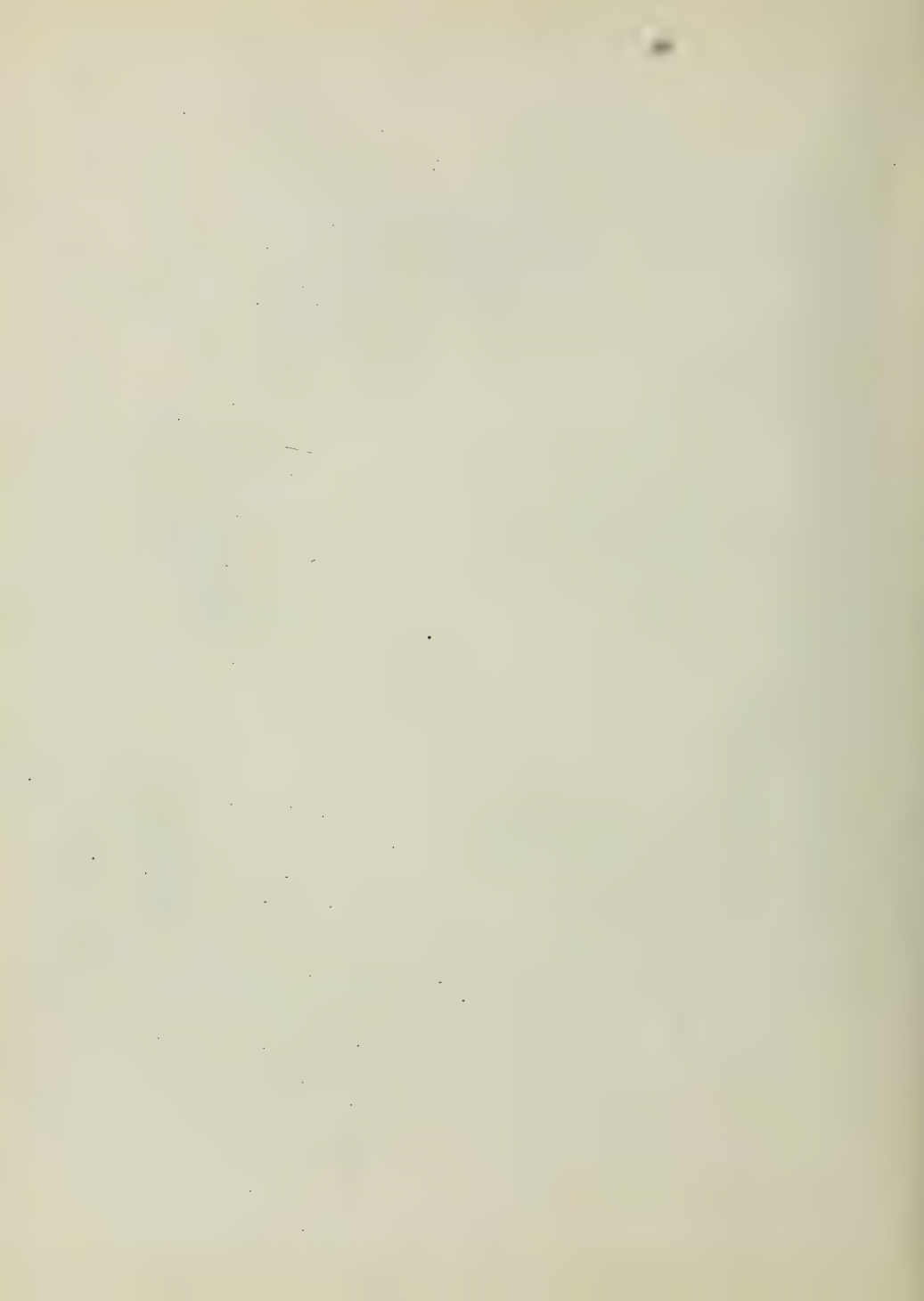
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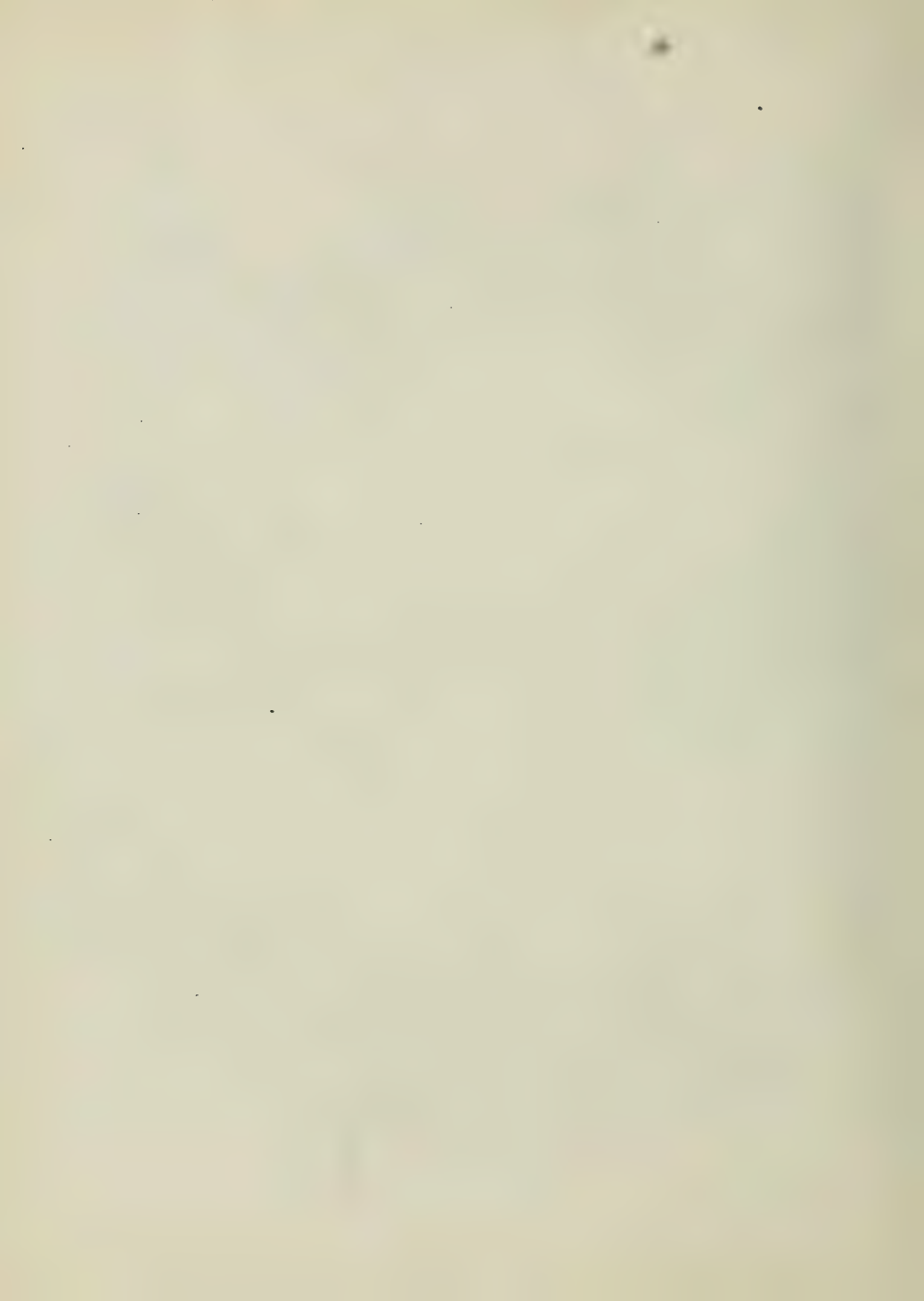




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7.



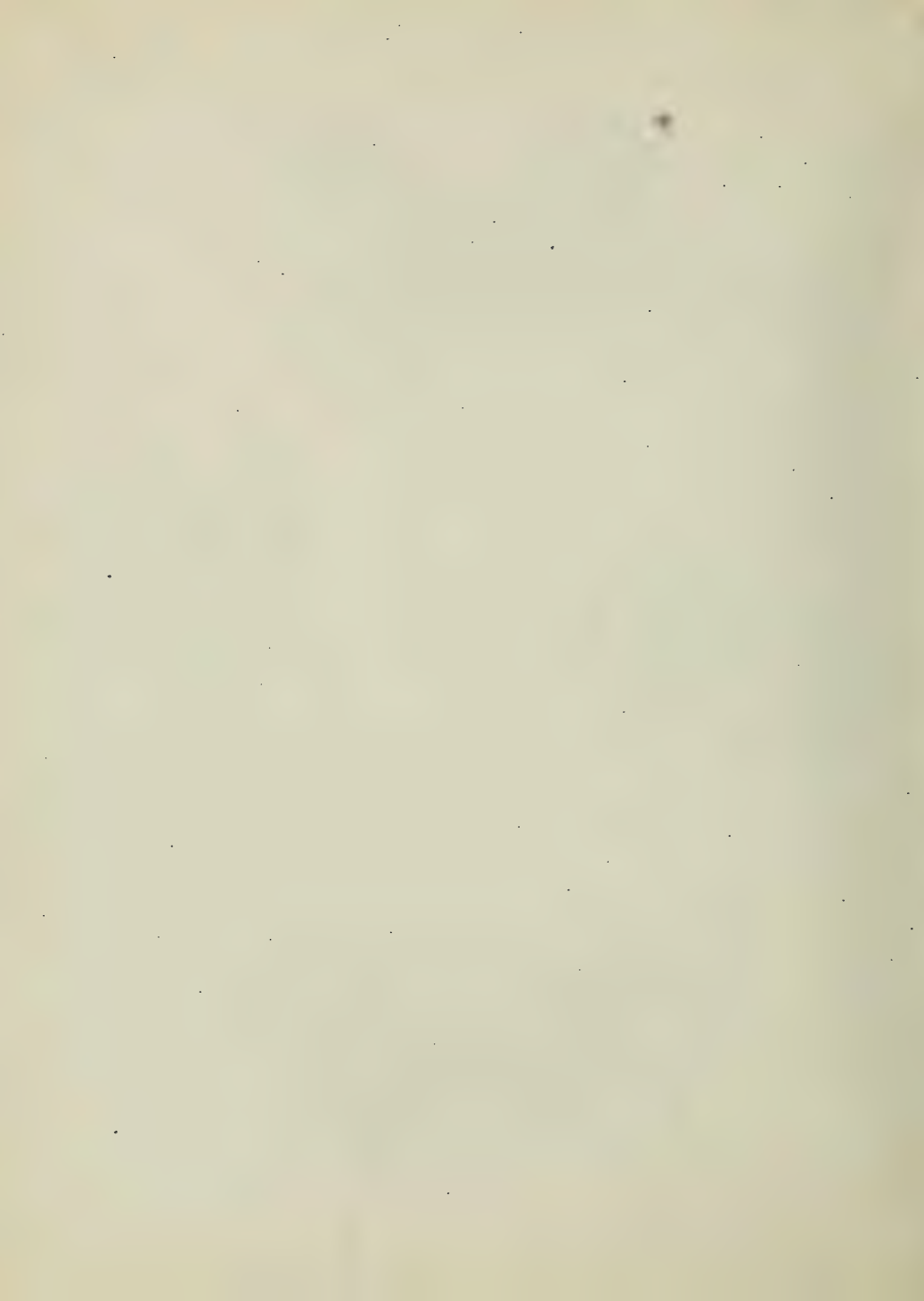
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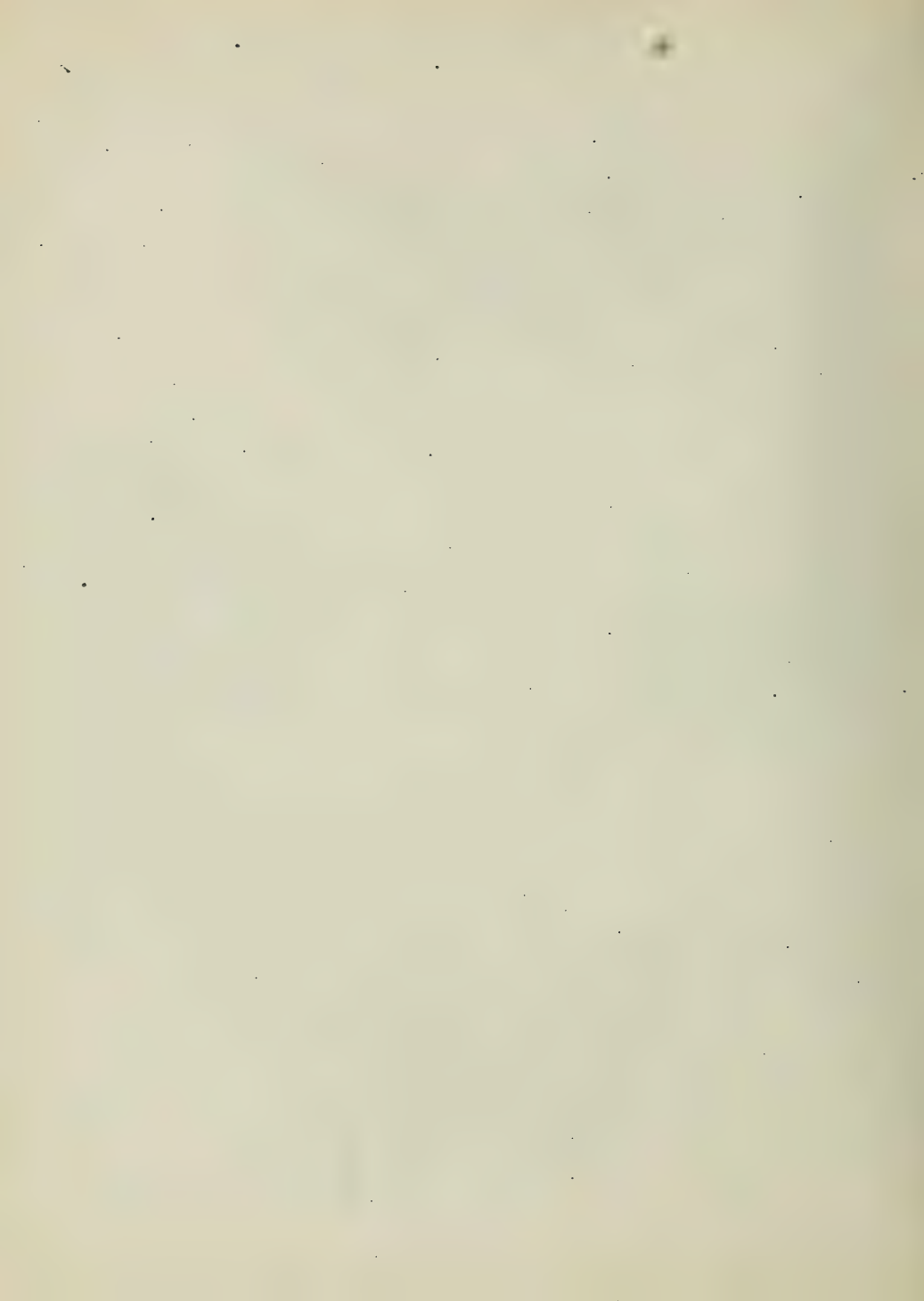
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2a



2b



3b





1.



1a



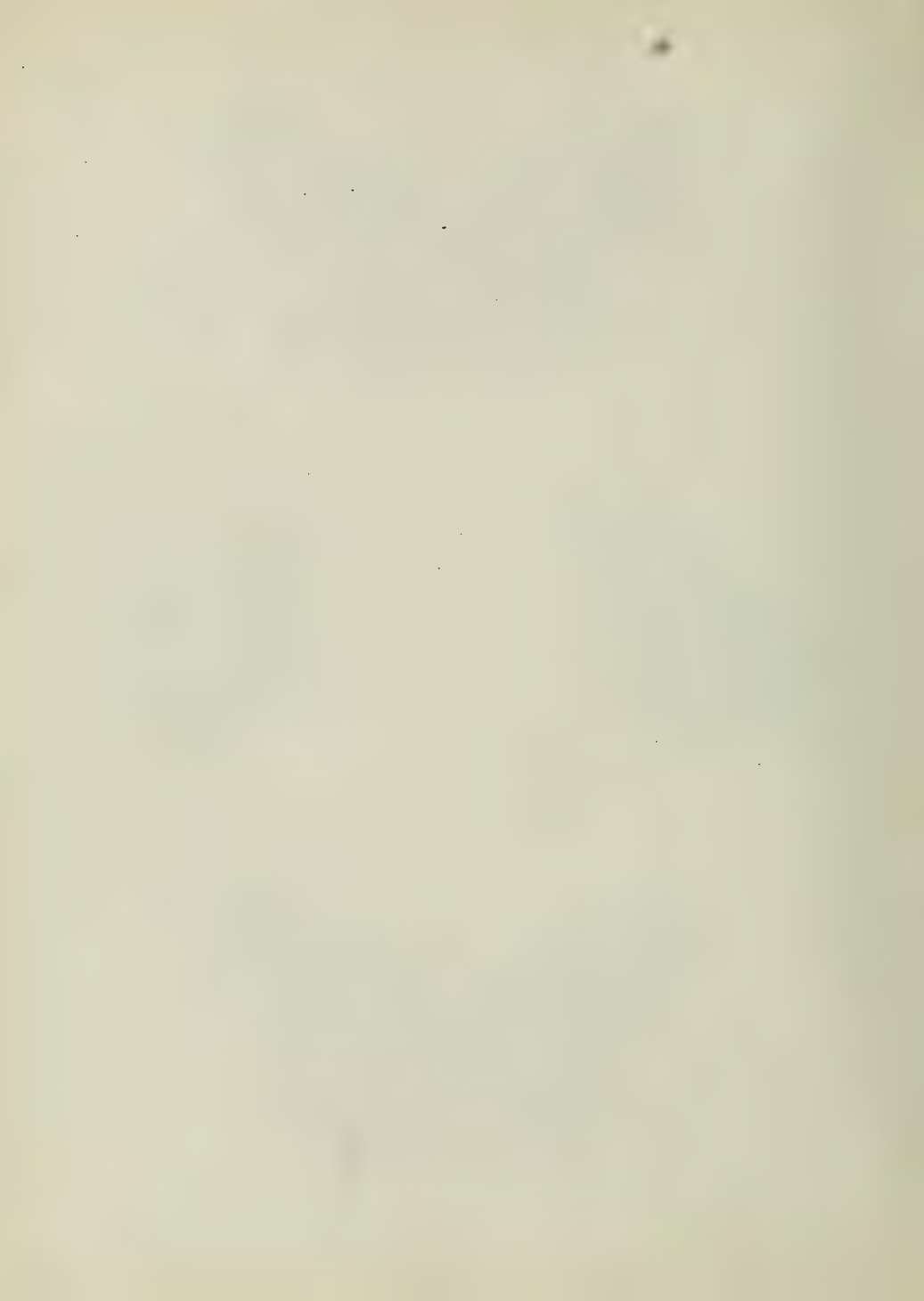
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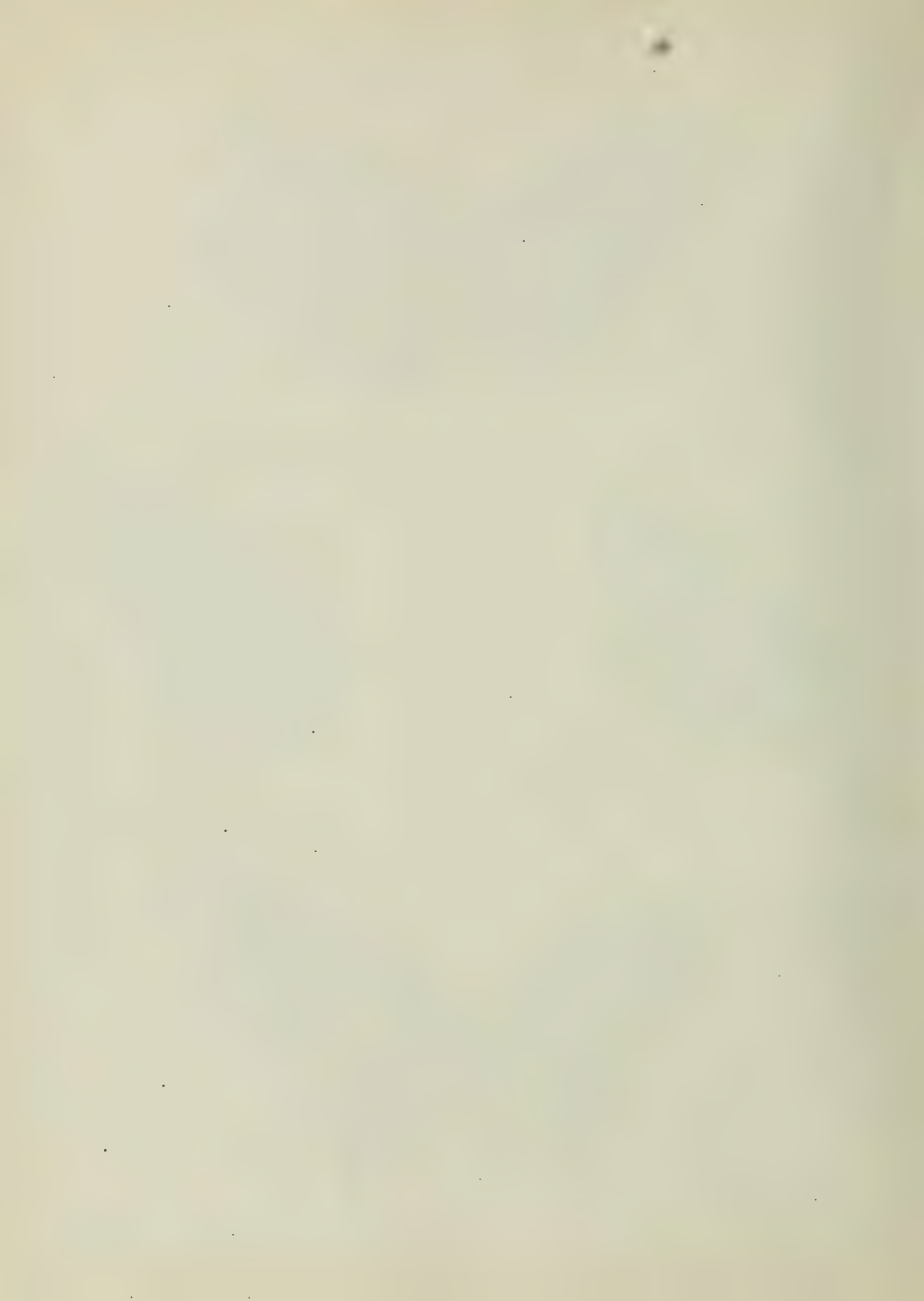
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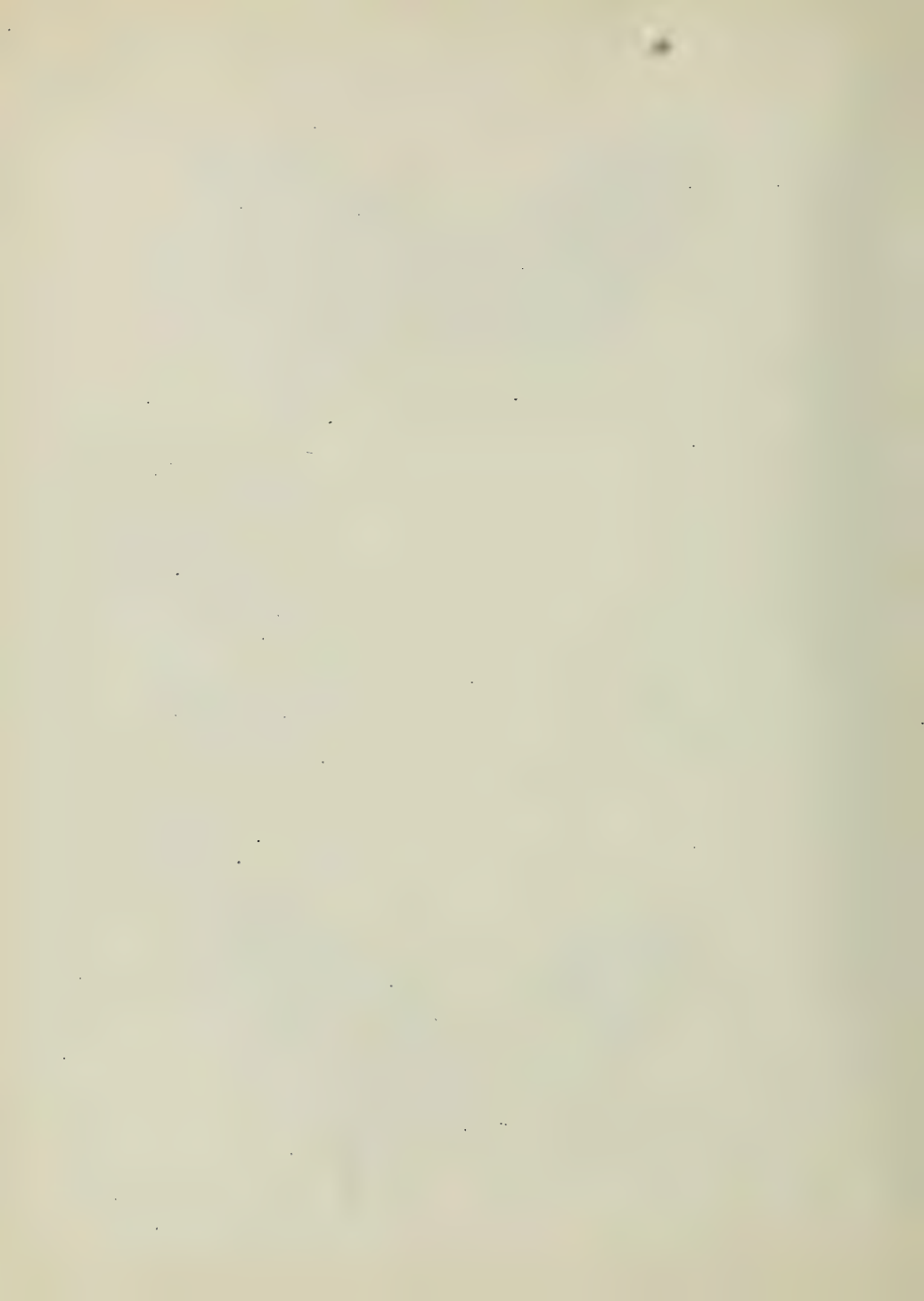




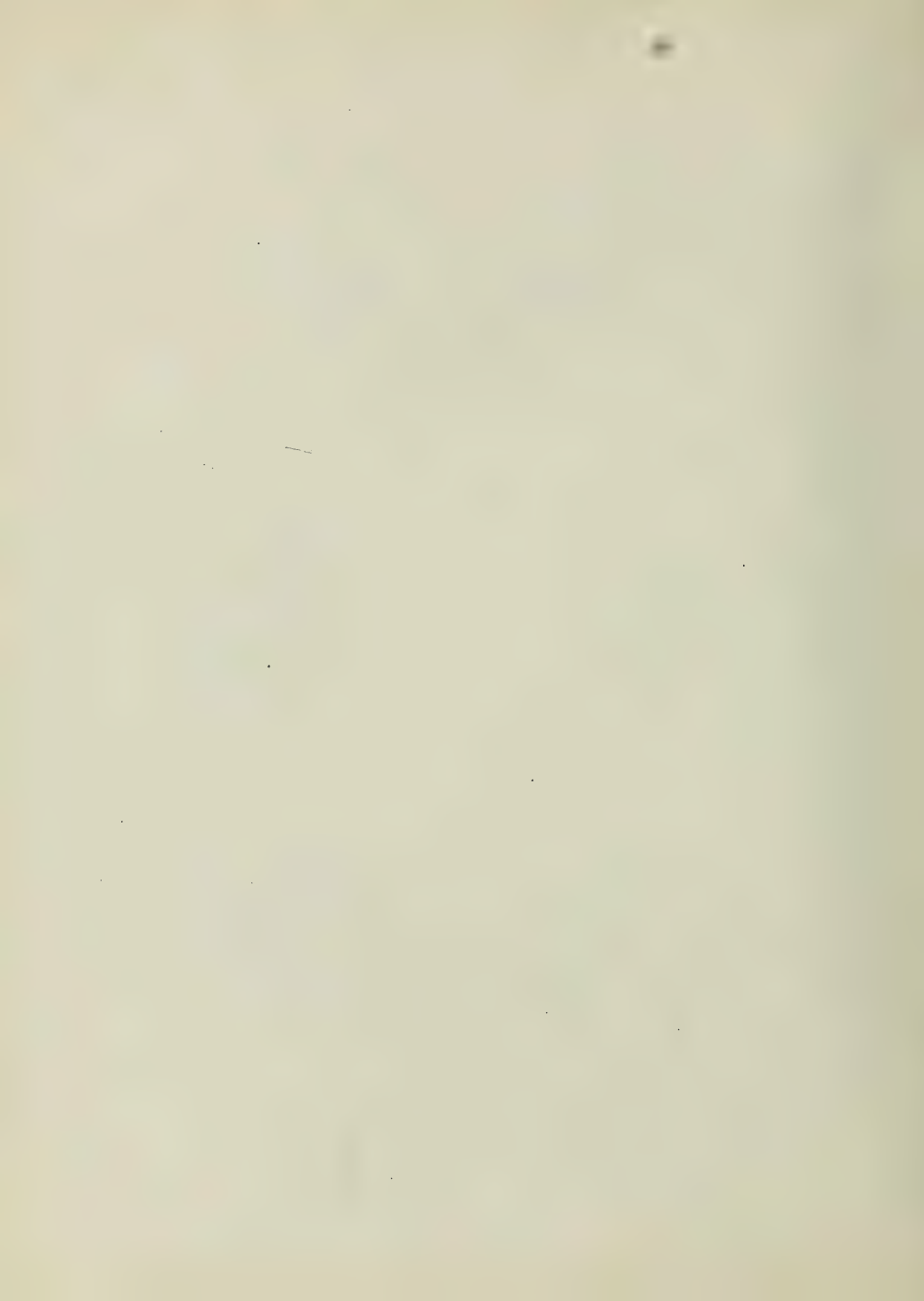
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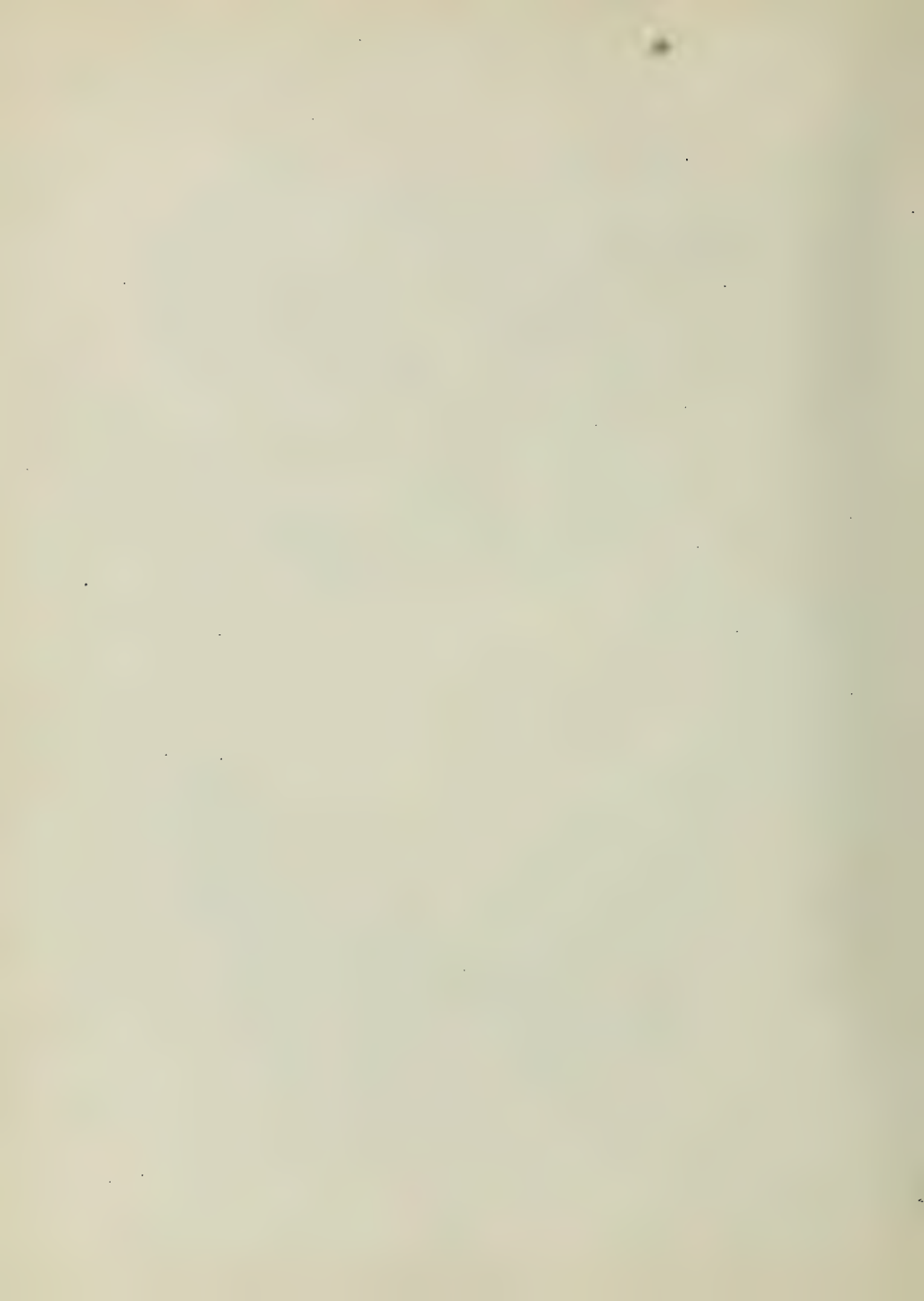




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7a.













7



7a



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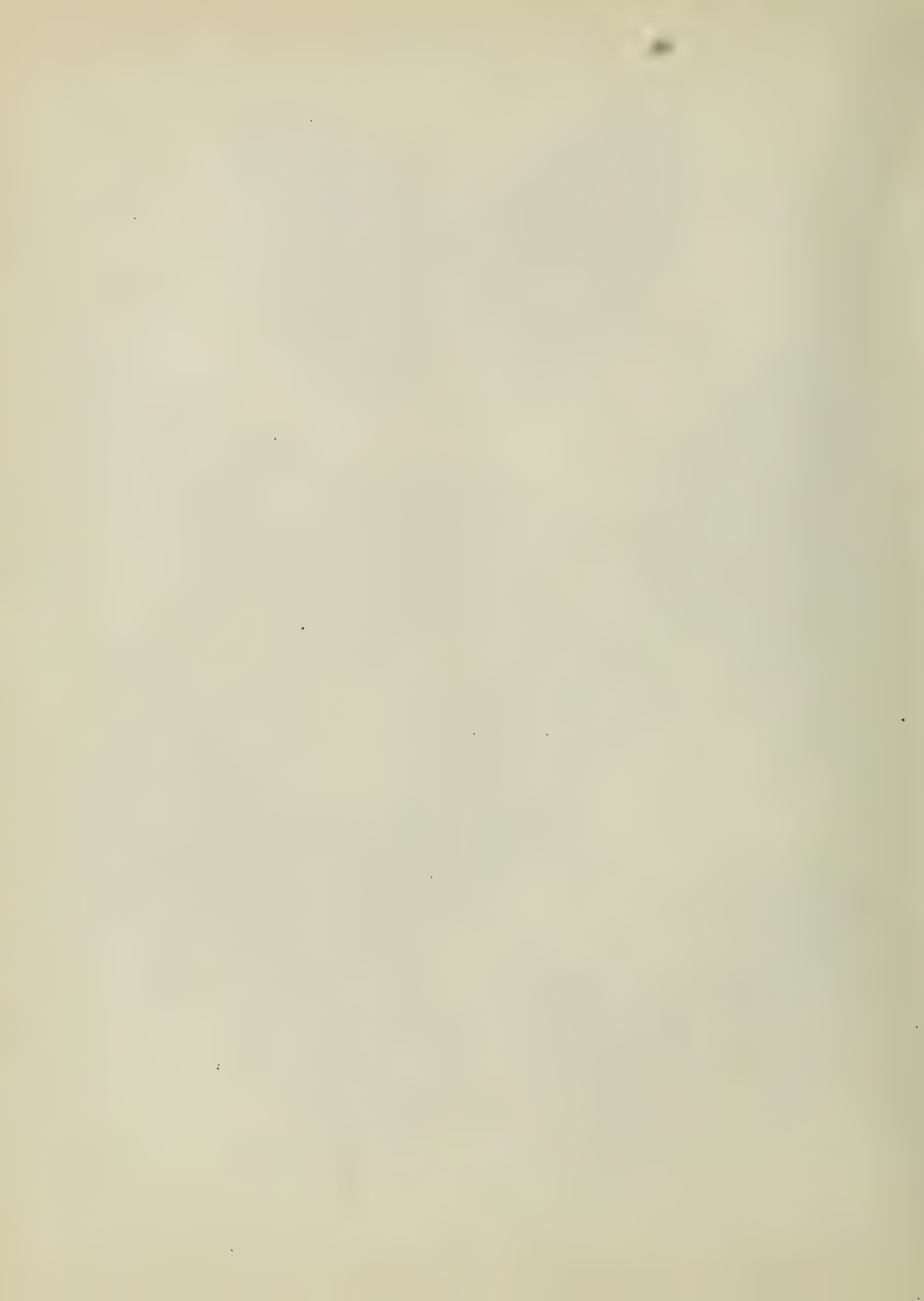
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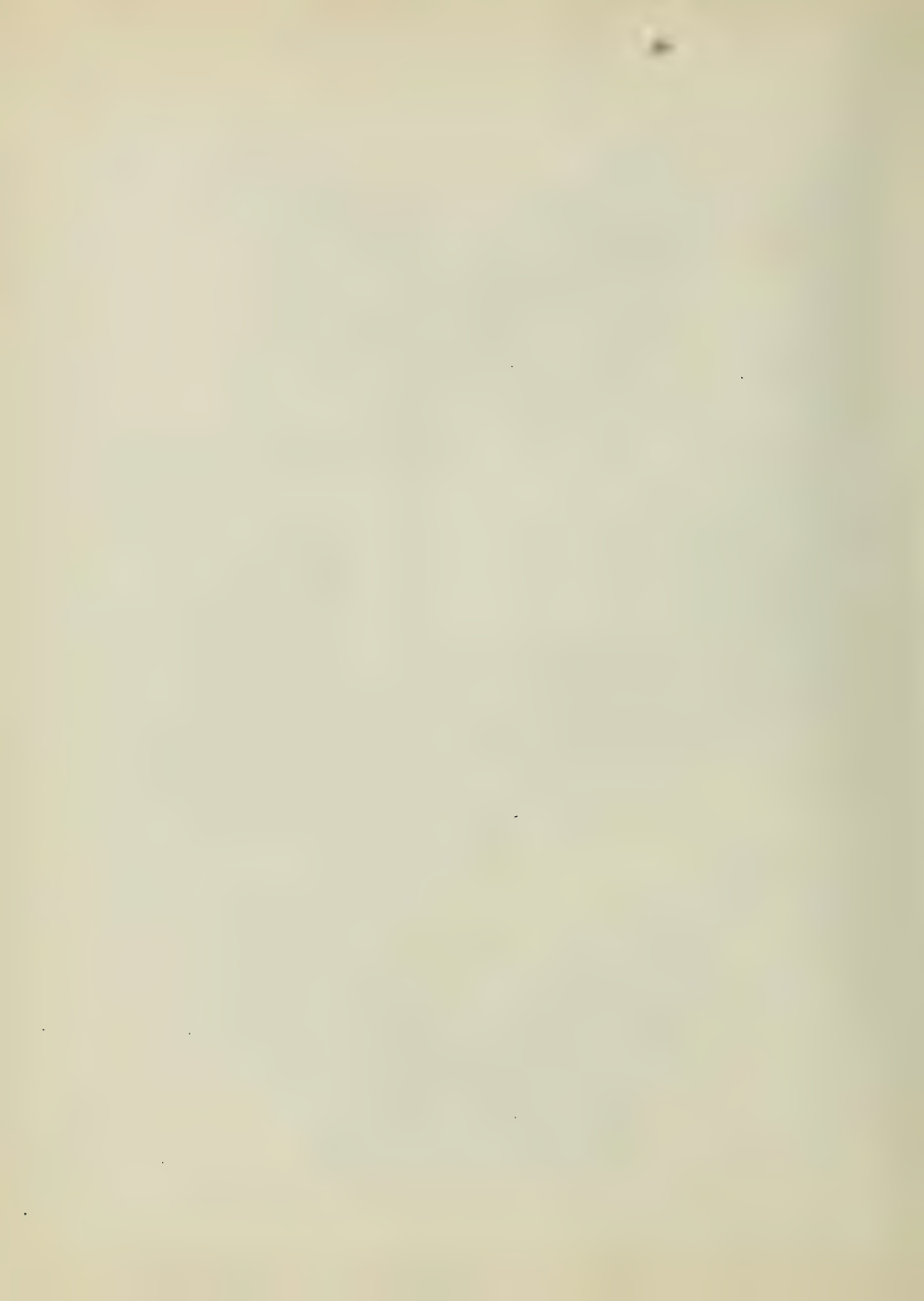










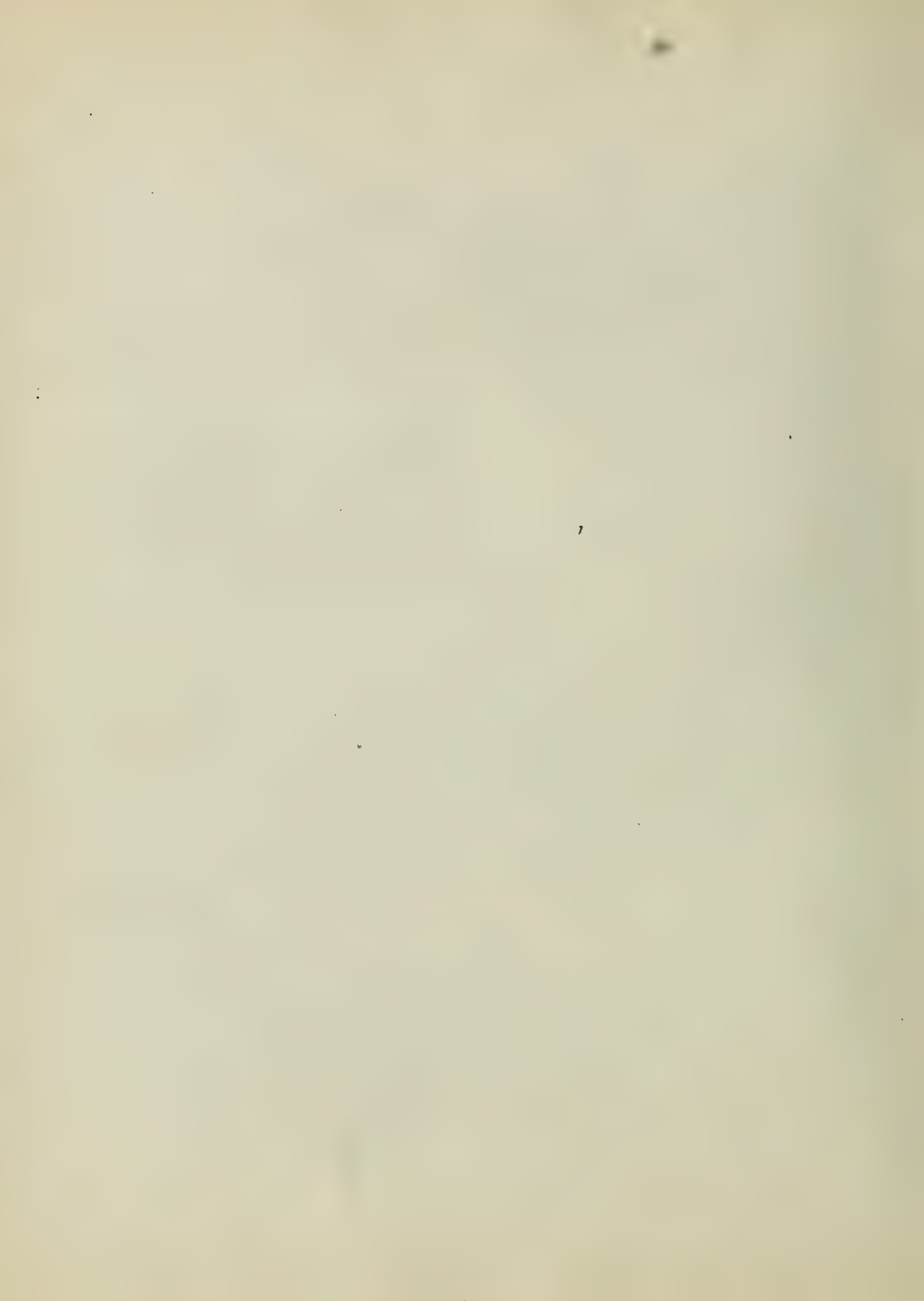




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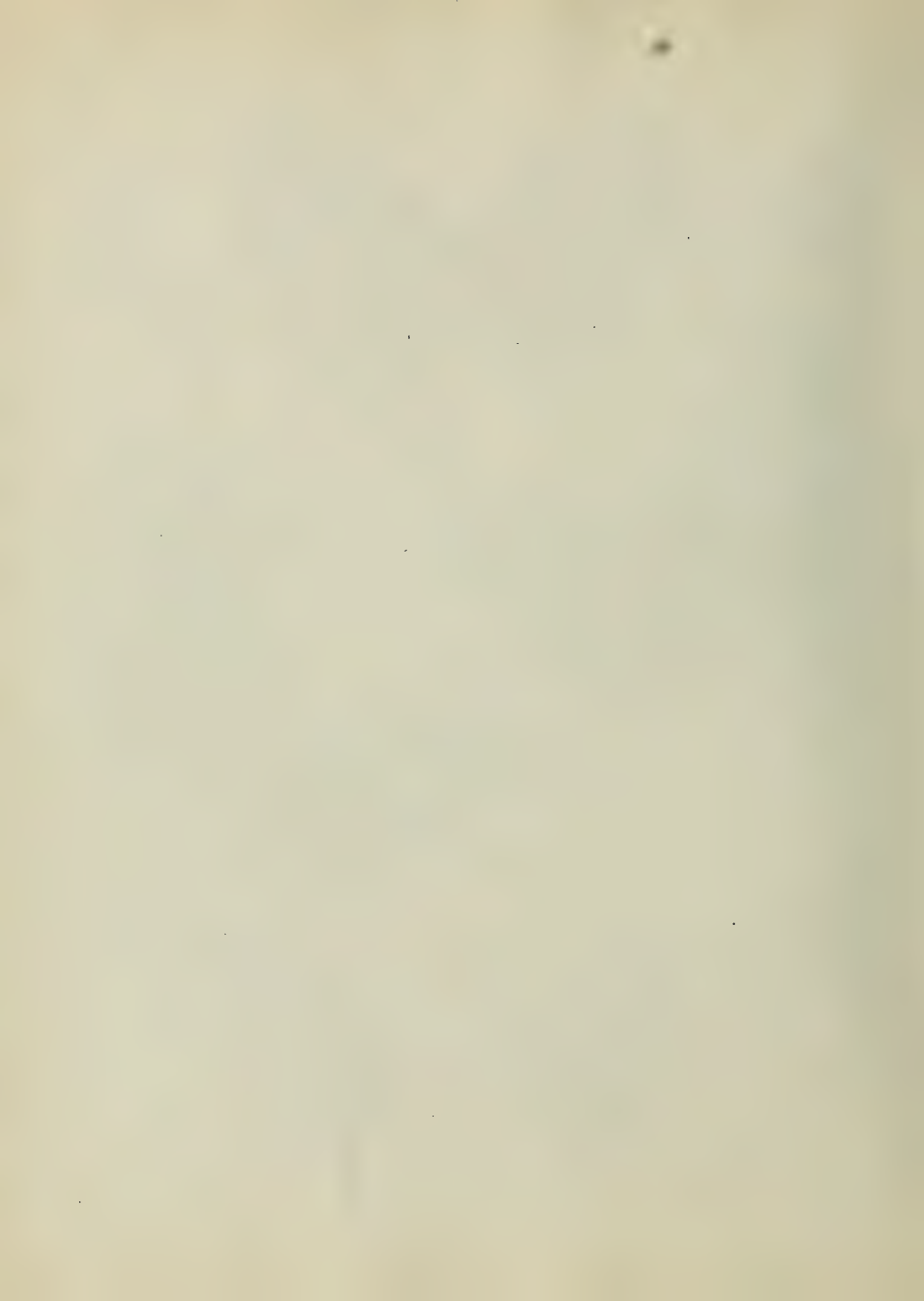




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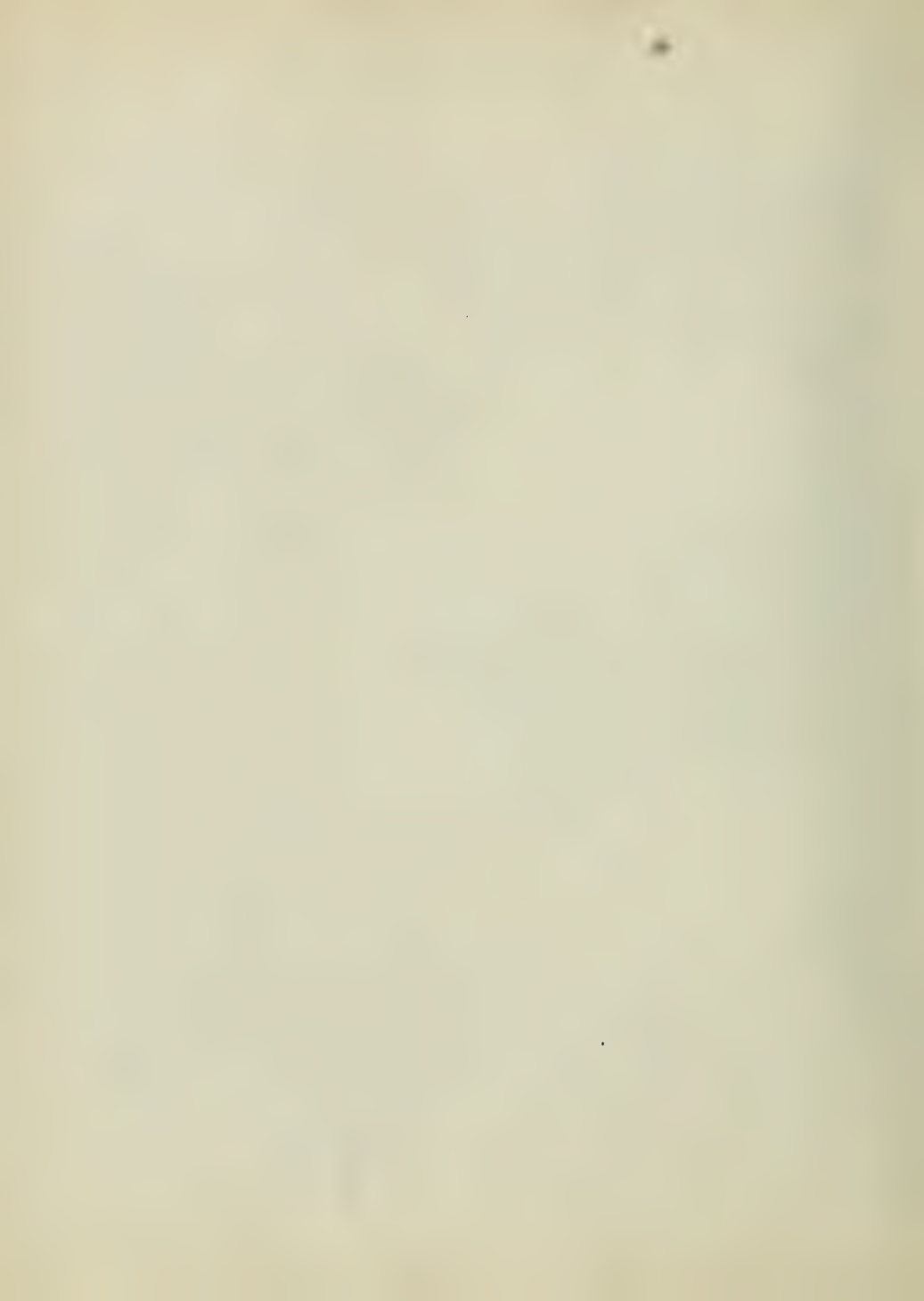
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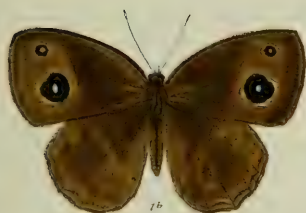
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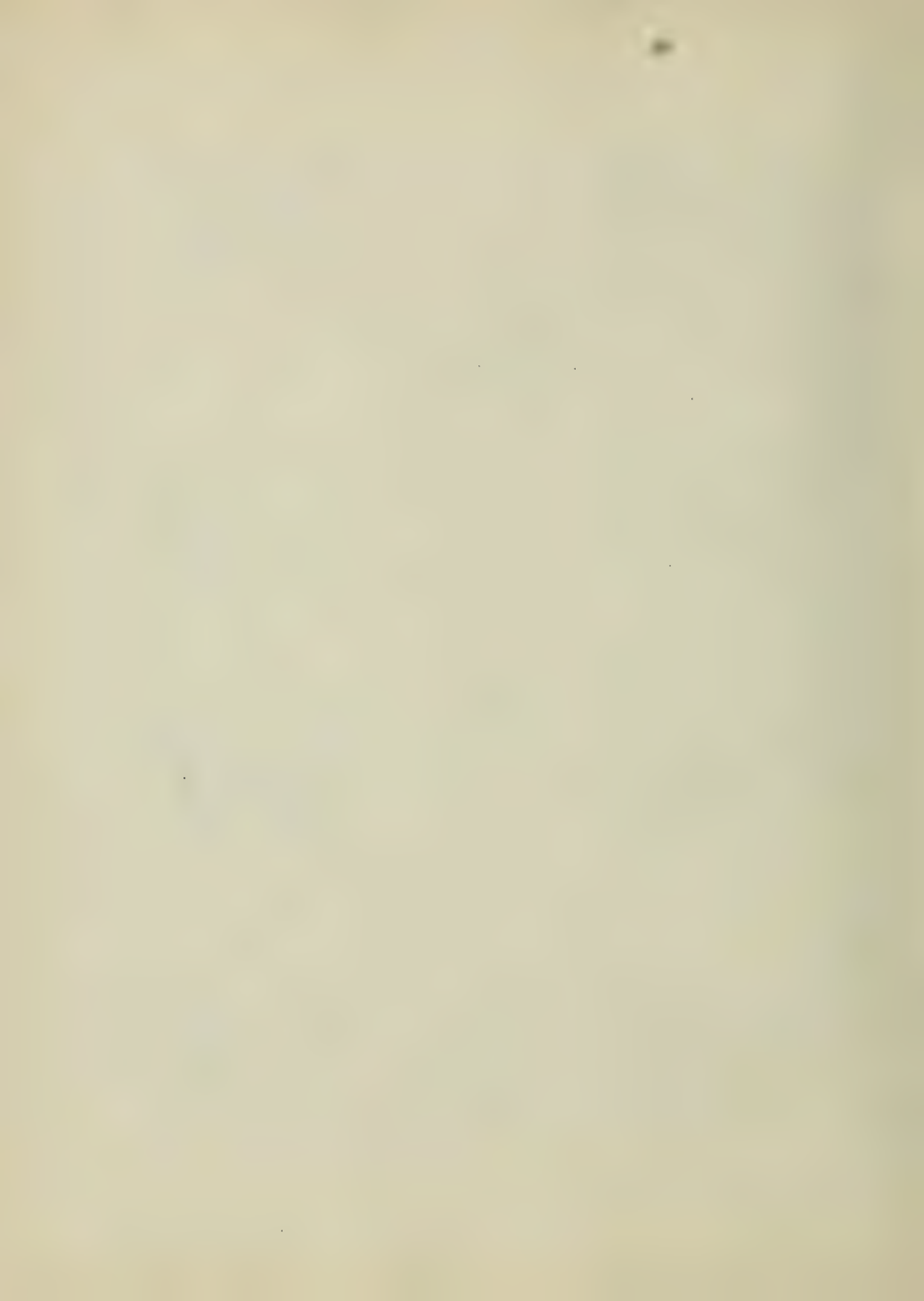
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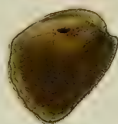
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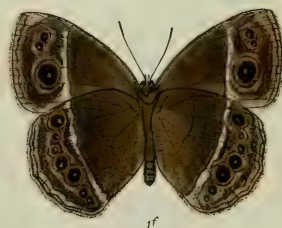
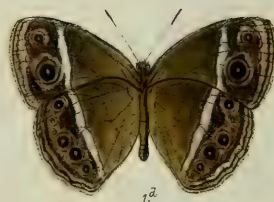


2b



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1



1b



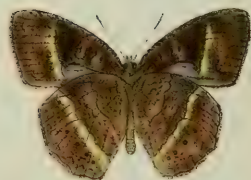
1a



1c



1d



1e



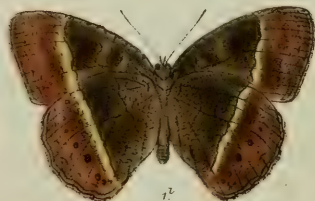
1f



1g



1h

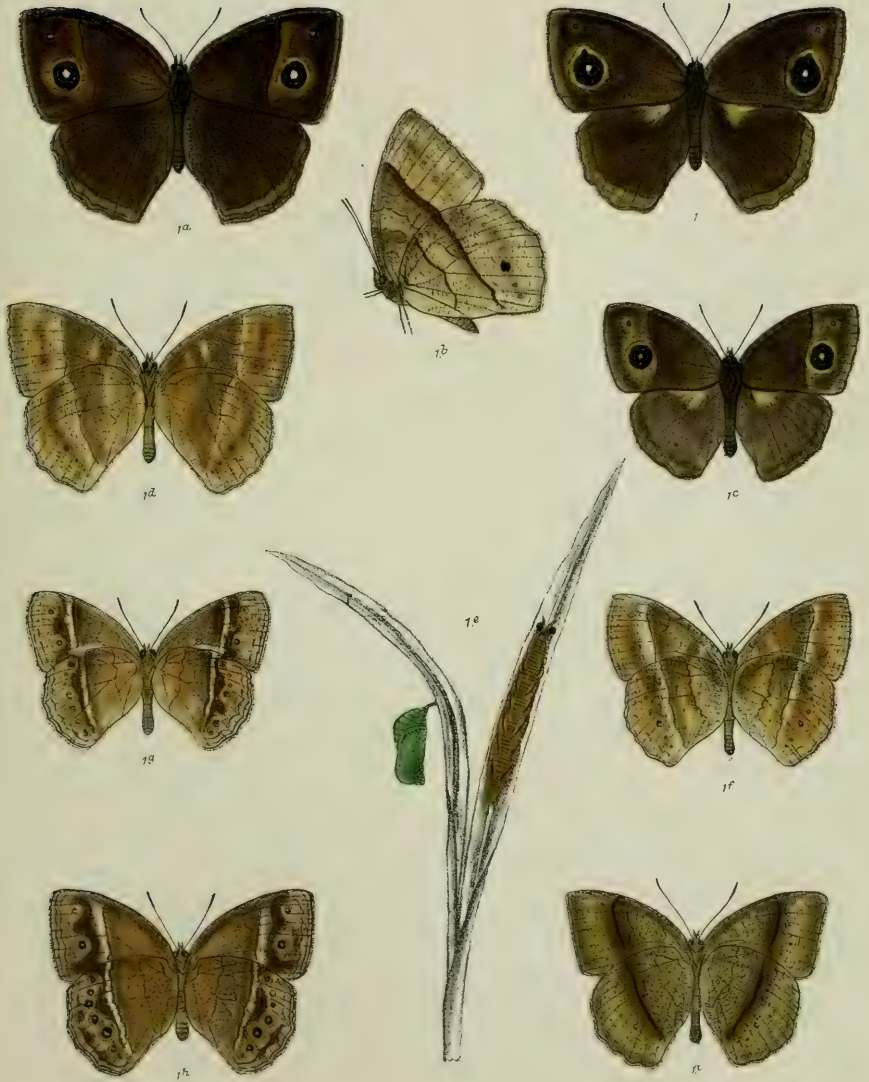


1i













1



1a



1b



1c



1d



1e



1f



1g



1h





1



1b



1a



1c



1d



2



2b



2a



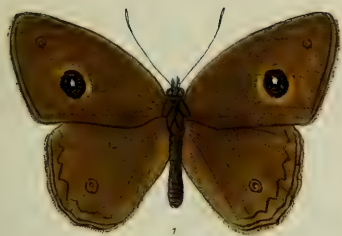
2c



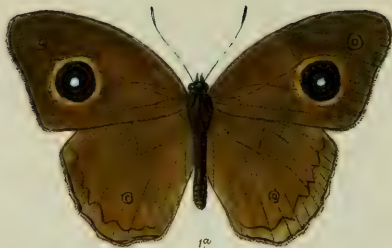
2d







1



1a



2



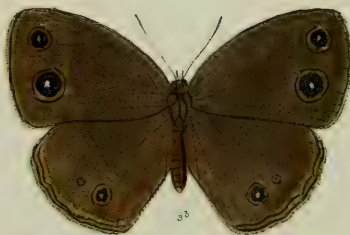
2a



3a



3



3b





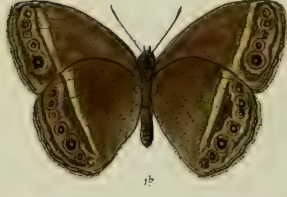
1



1a



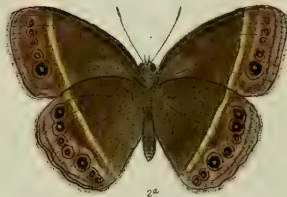
1c



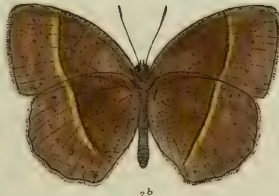
1b



2



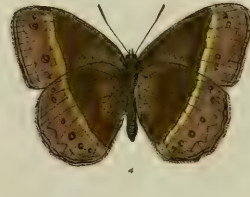
2a



2b

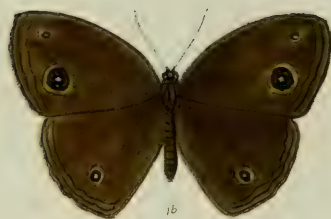


3



4









1



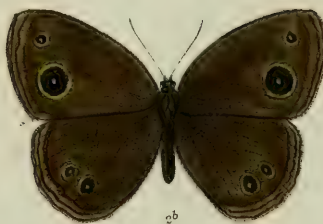
1^a



1^b



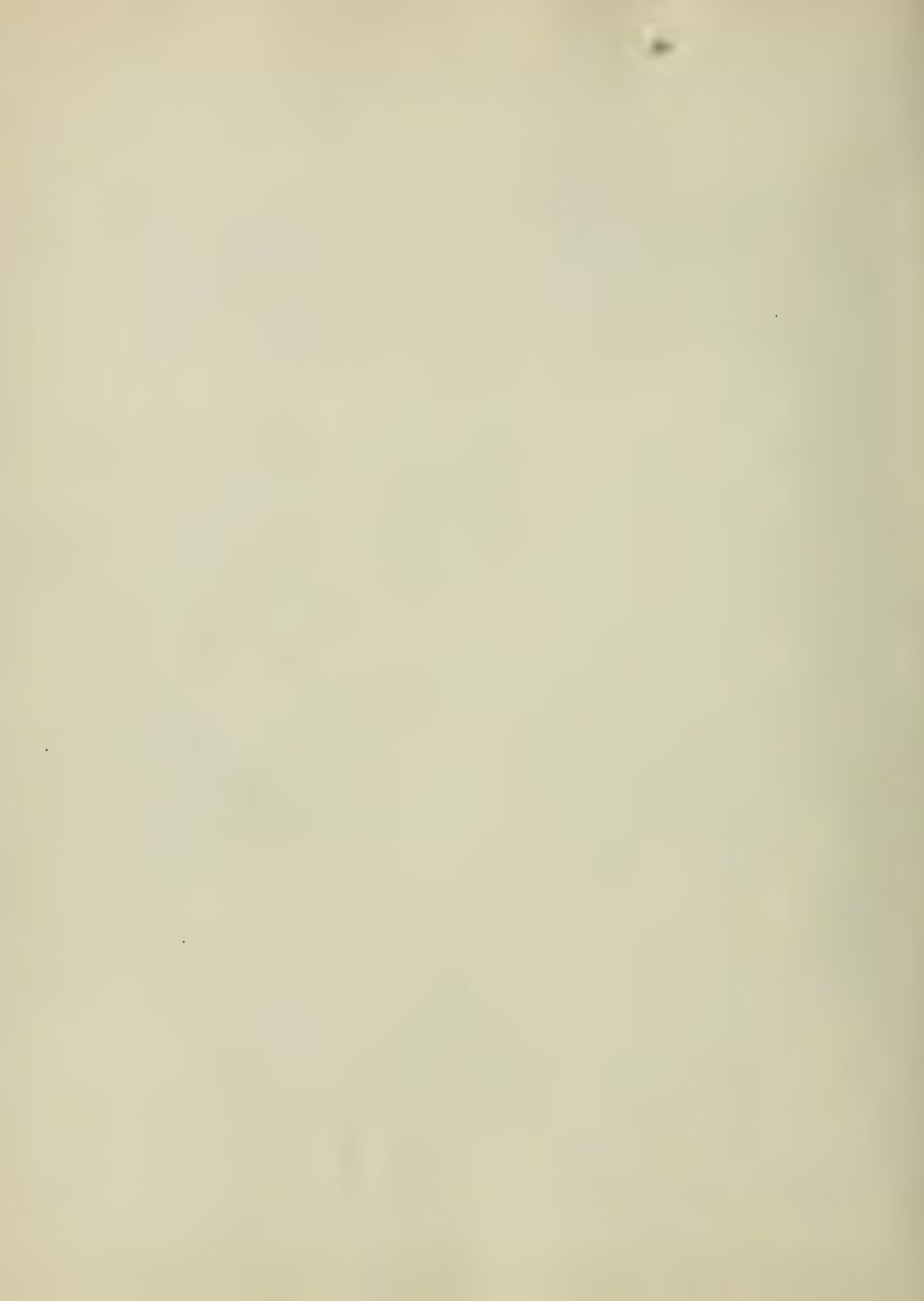
2



2^a



2^b





1



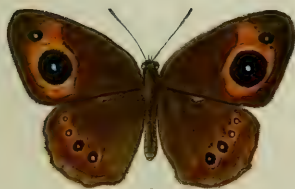
1b



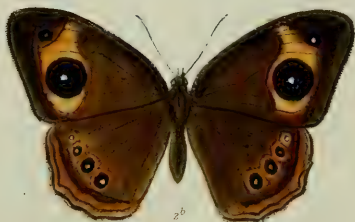
1a



1c



2



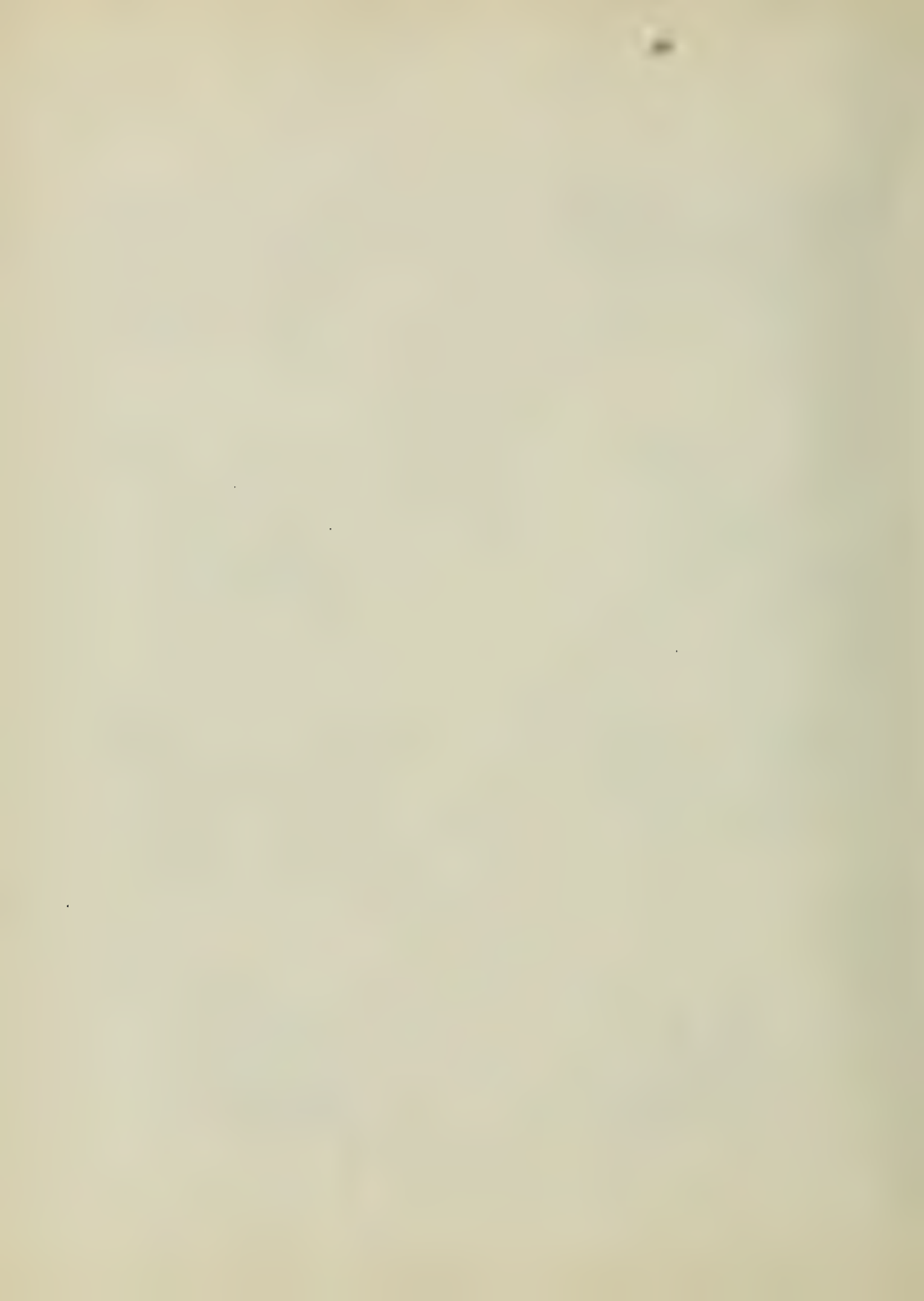
2b

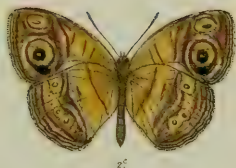


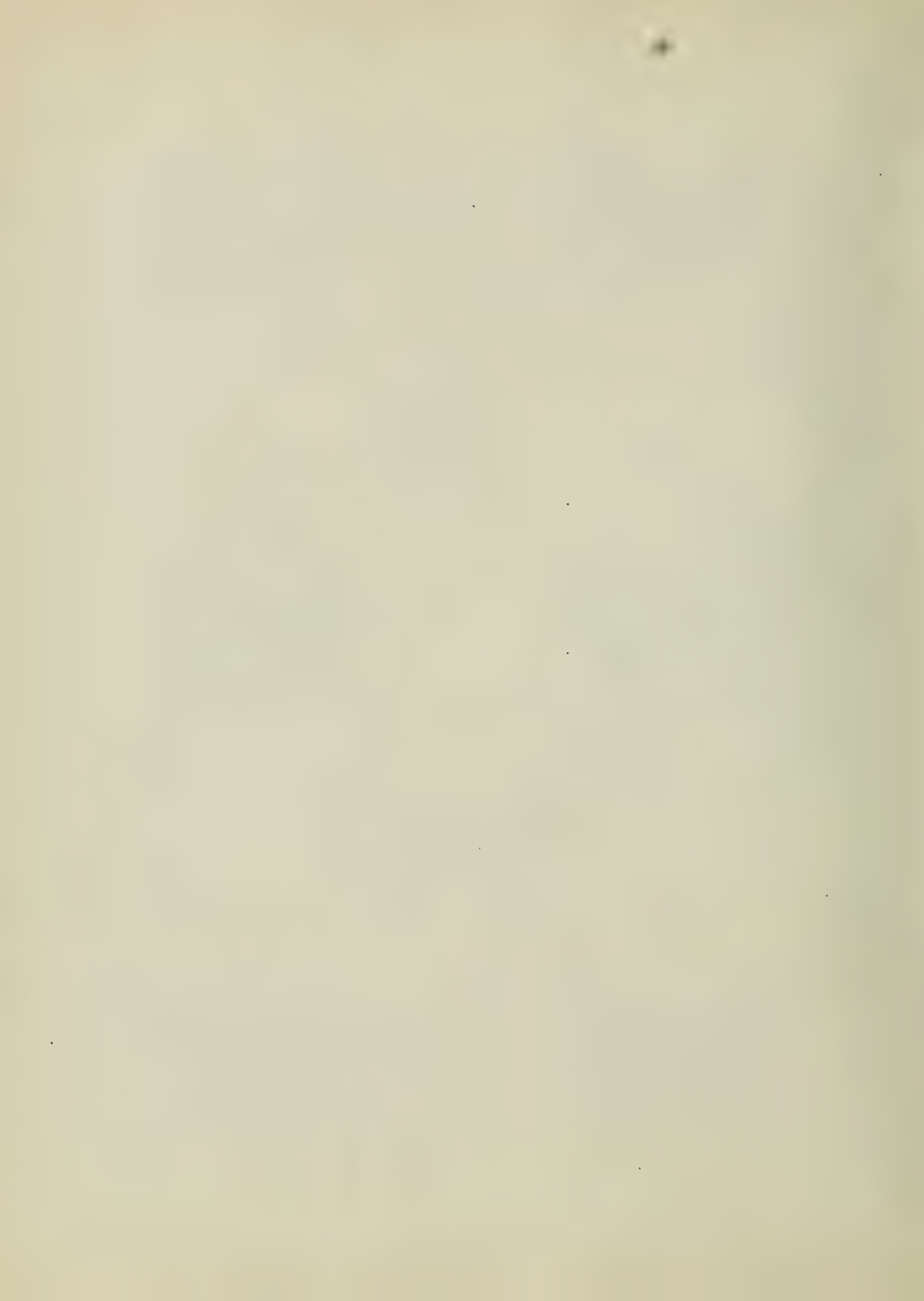
2a

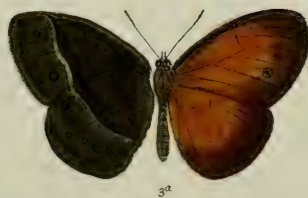
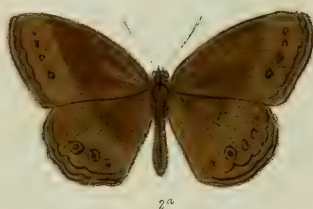


2c













1



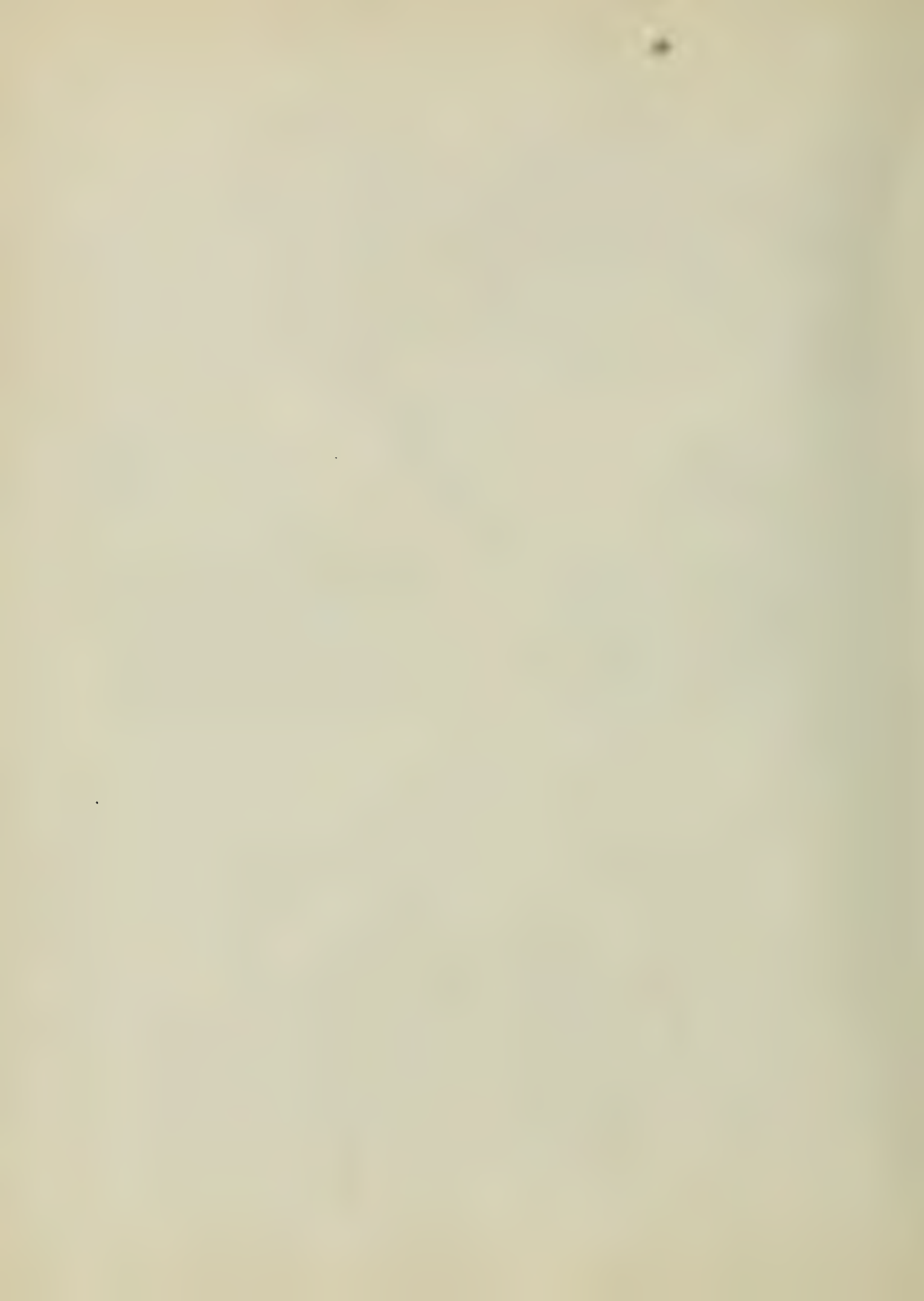
1a



2a

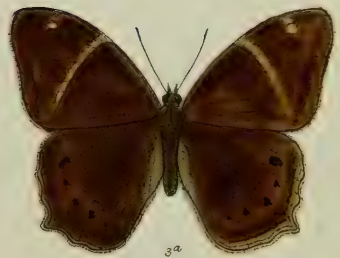
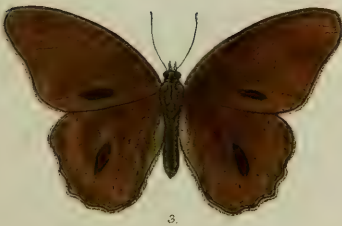
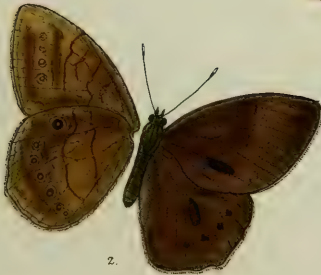
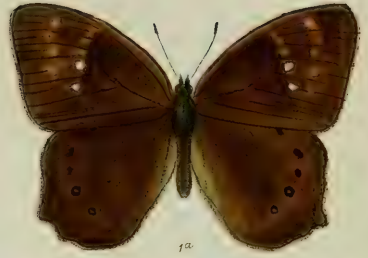
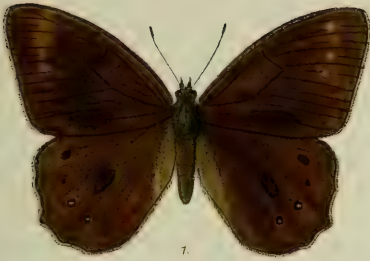


2





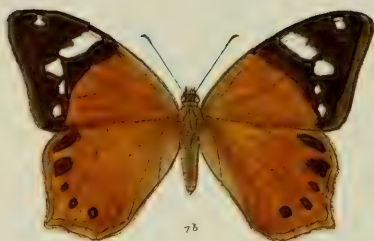








7.



7b



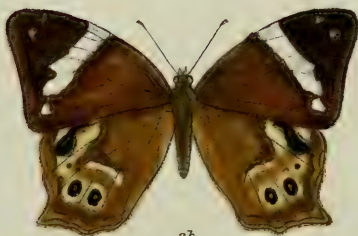
7a



2a

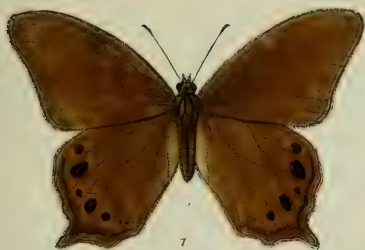


2.

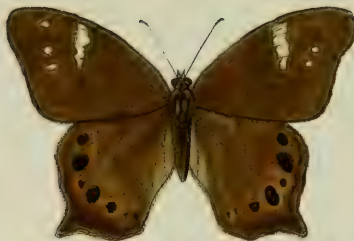


2b





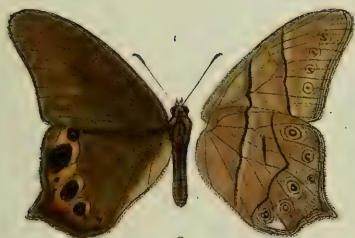
1



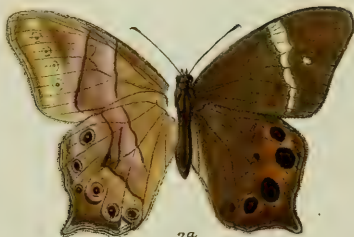
1b



1a



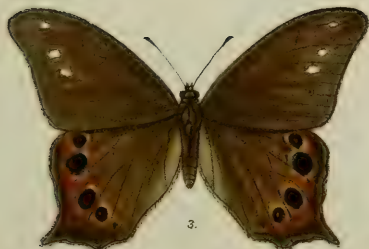
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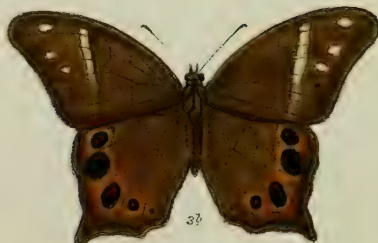
2a



2a



3



3b

F.C. Moore, del. lith.

Vincent Brooks, Day & Son, Imp.

L. Reeve & Co. London.





7.



7b



7a



7c



2a



2.

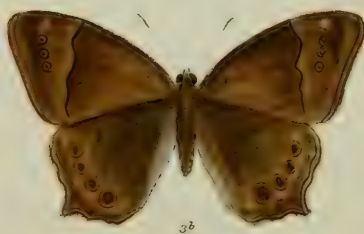
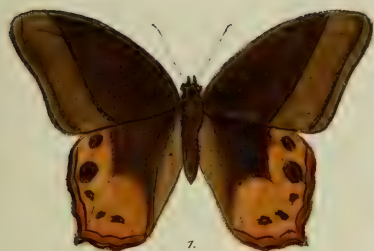


2b

F.C. Moore, del. et lith.

Vincent Brooks Day & Son, Imp



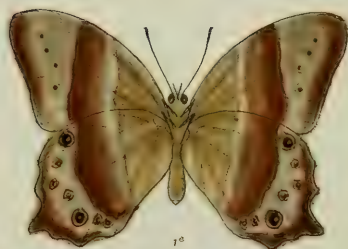
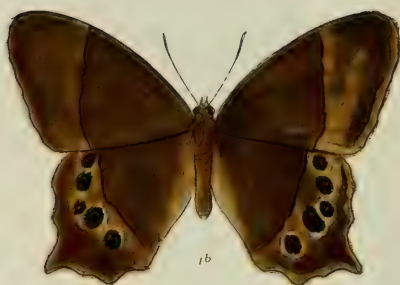


F. C. Moore, del et lith.

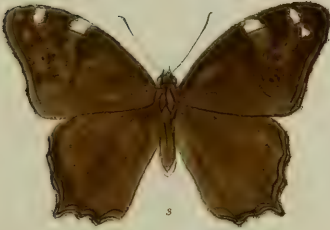
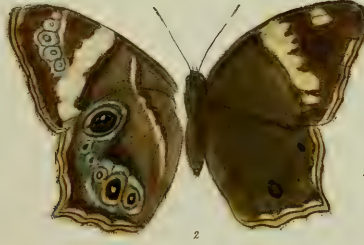
Vincent Brooks Day & Son, Imp.

L. Reeve & Co, London.

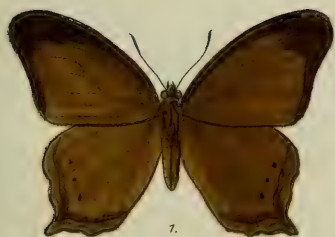




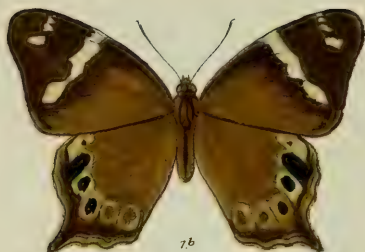








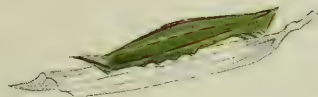
1.



1b



1a



1a



1c



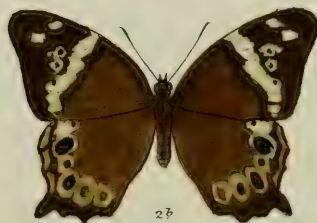
2a



2c



2.

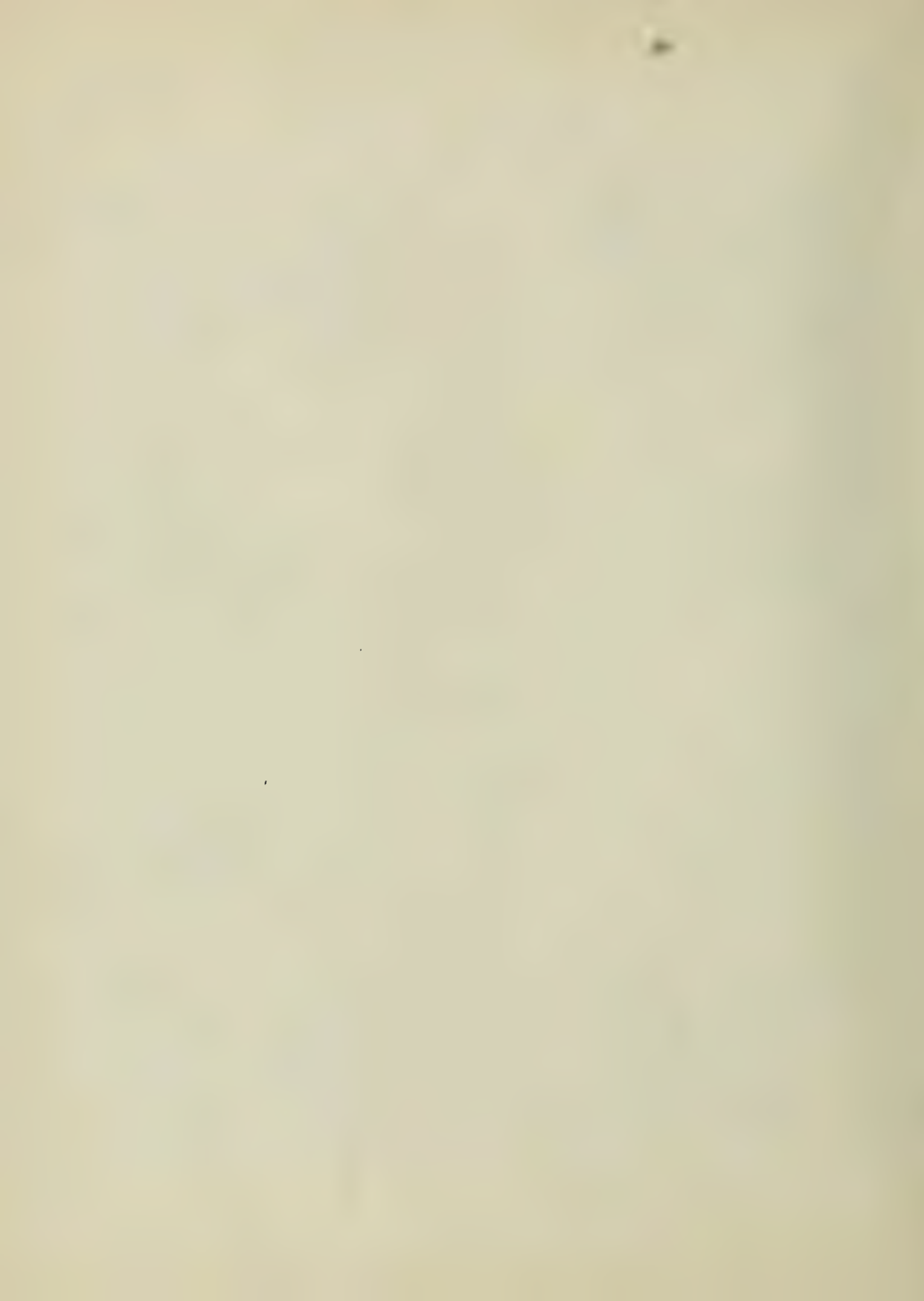


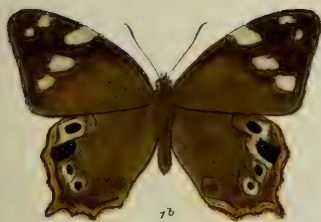
2b

F.C. Moore, del. et lith.

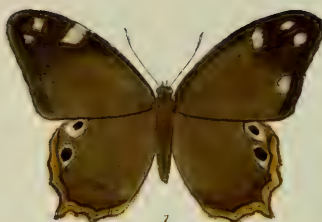
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L. Reeve & Co London.





7b



7



7a



7c



7d



2a



2c



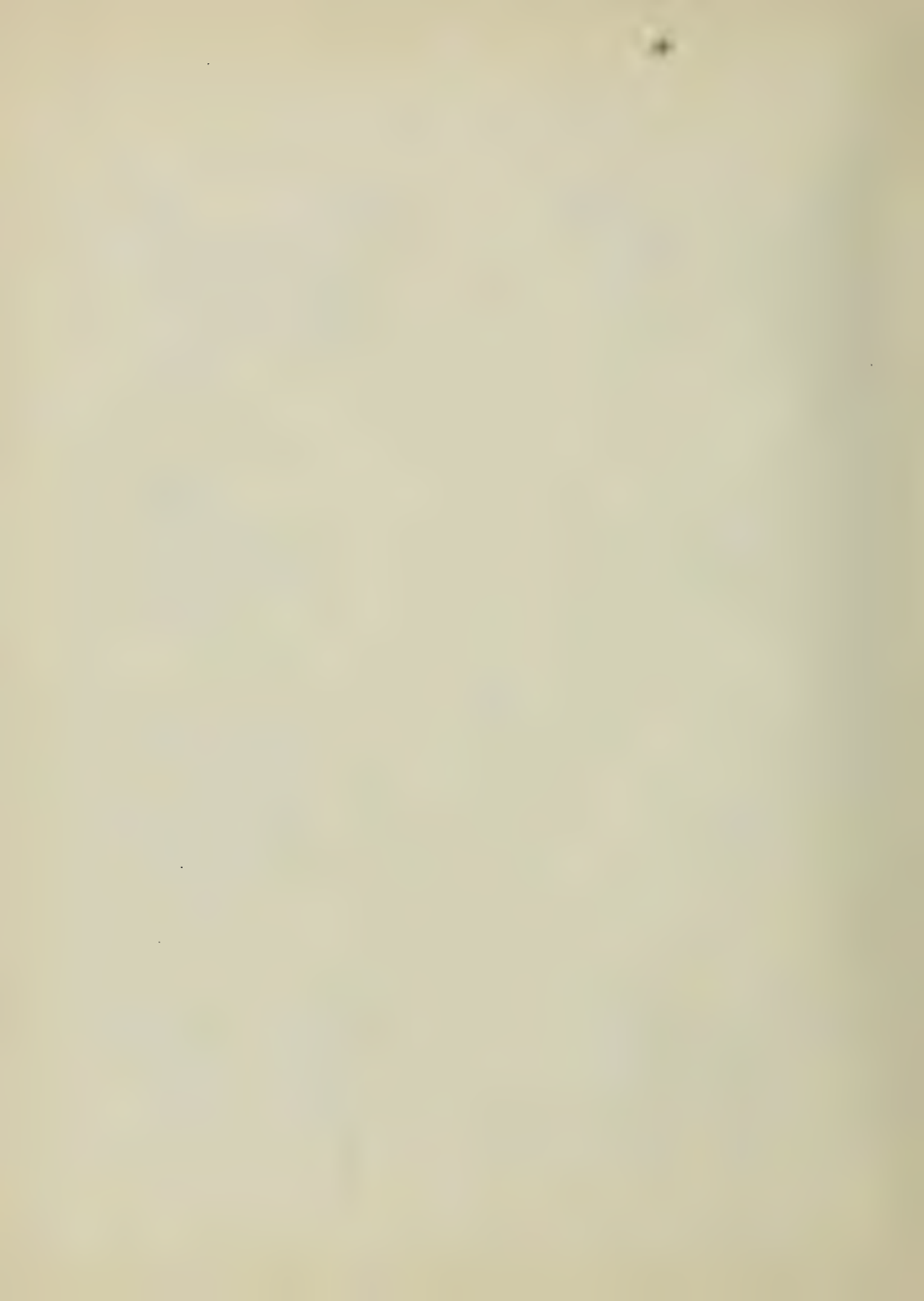
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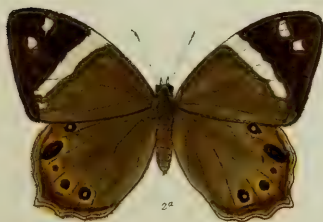


2b

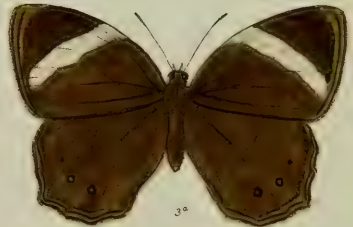
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7.



7b



7a



7c



2



2b

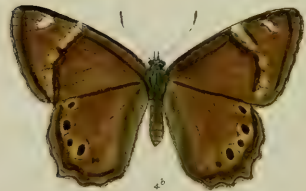
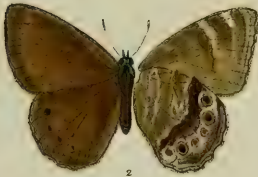
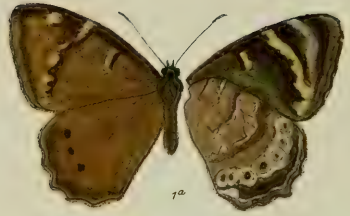


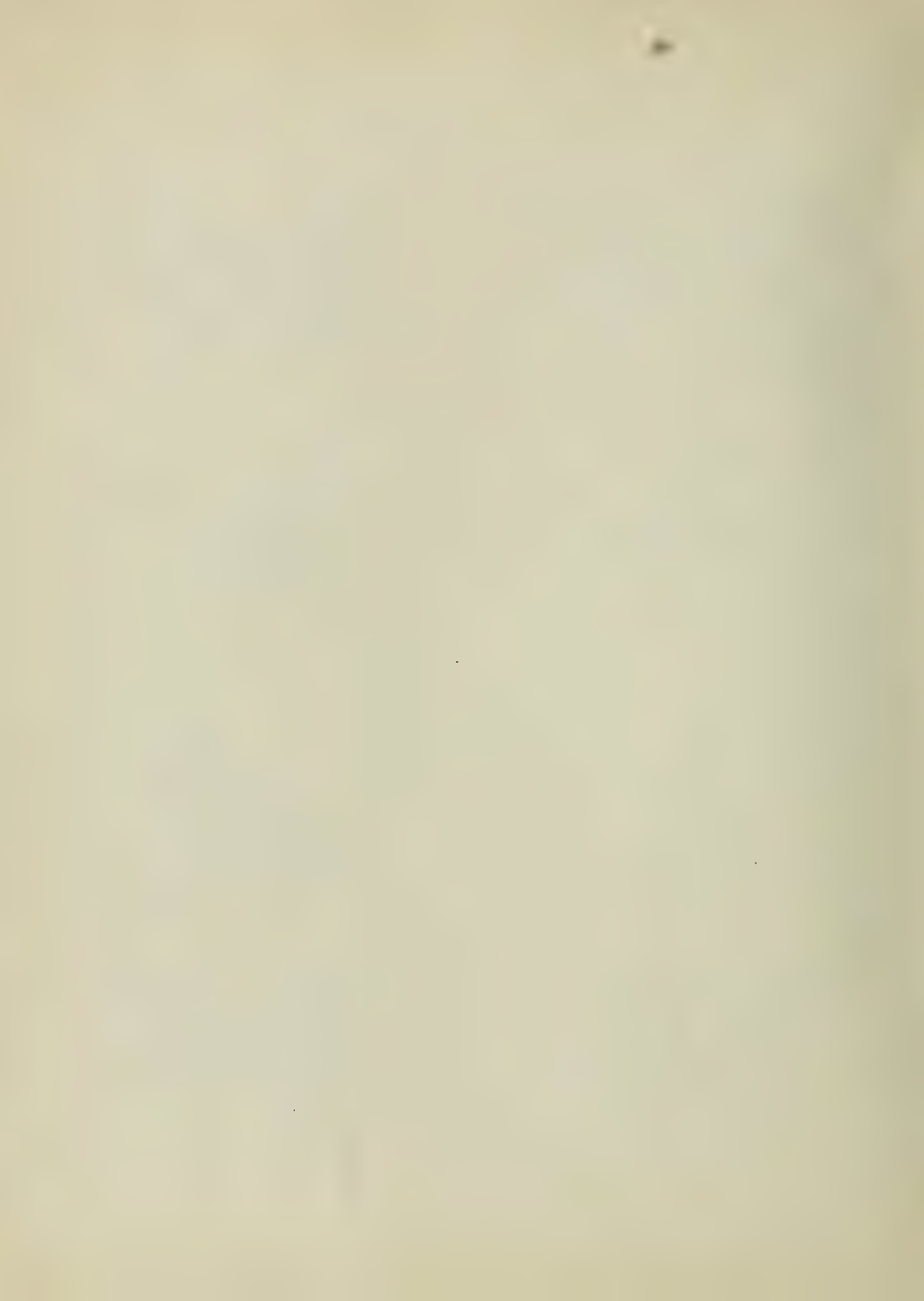
2a



2c

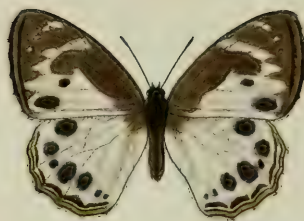








1.



1b



1a



1c



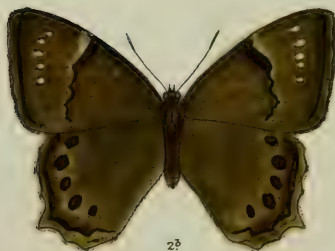
2a



2c



2.



2b

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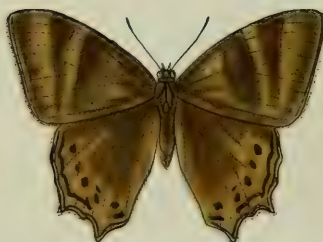
1.



1a.



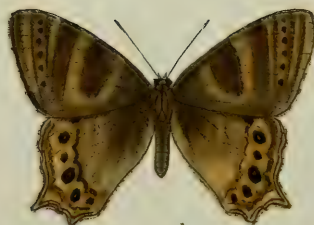
2.



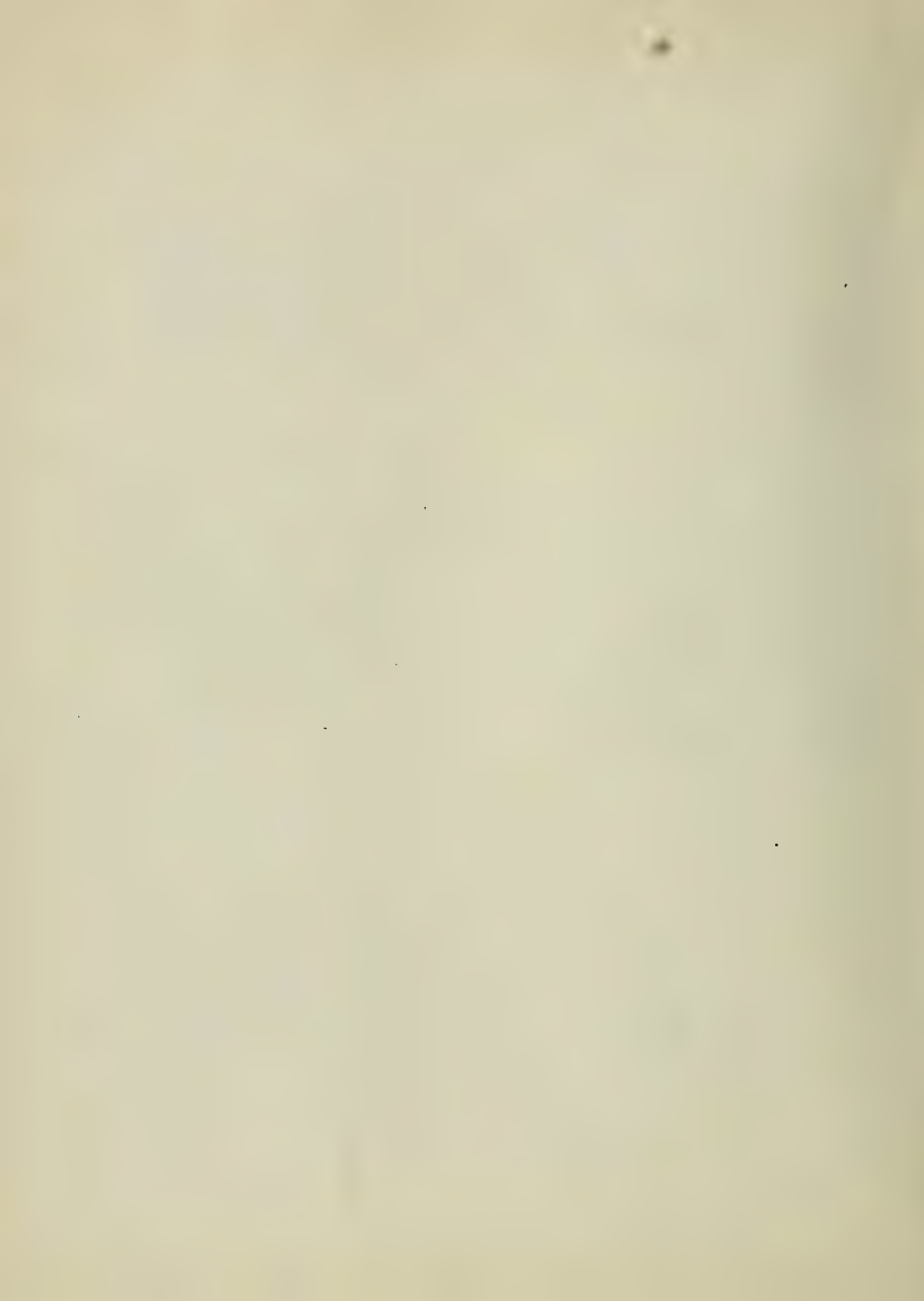
2a.



3.

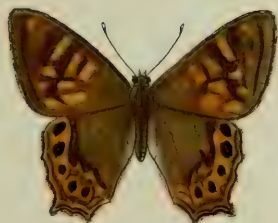


3a.









1.



1a



2.



2a



3.



4.



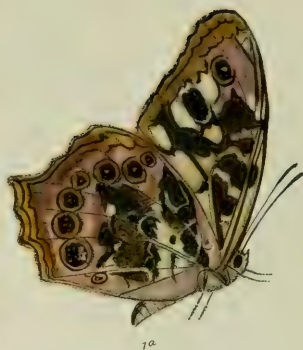
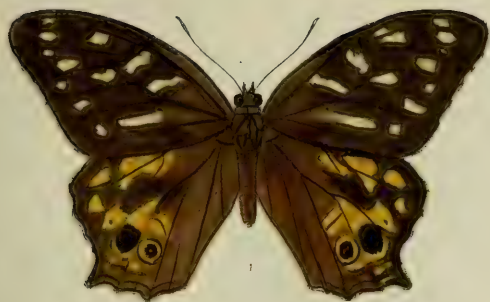
4a

F.C. Moore, del. et lith.

Vincent Brooks Day & Son, Imp

L. Reeve & Co. London.









1.



2.



3.



4.



5.



5a

